

# Southeastern American Kestrel

## *Falco sparverius paulus*



Photograph by Jack Rogers.

### Overview

**Status:** Listed as state Threatened on Florida's Endangered and Threatened Species list.

### Current Protections

- 68A-27.003 (2)(a), F.A.C. No person shall take, possess, or sell any threatened species included in this subsection or parts thereof or their nests or eggs except as authorized by Commission rule or by permit from the Commission or when such conduct is authorized in a management plan as defined in this chapter and approved by the Commission, or as authorized in Commission-approved guidelines.
- 68A-27.001(4), F.A.C. Take – to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in such conduct. The term “harm” in the definition of take means an act which actually kills or injures fish or wildlife. Such act may include significant habitat modification or degradation where it actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding or sheltering. The term “harass” in the definition of take means an intentional or negligent act or omission which creates the likelihood of injury to wildlife by annoying it to such an extent as to significantly disrupt normal behavioral patterns which include, but are not limited to, breeding, feeding or sheltering.
- Southeastern American kestrels, active nests, eggs, and young are also protected under the Federal Migratory Bird Treaty Act and state Rule 68A-16.001, F.A.C.
- 68A-16.006, F.A.C., prohibits the use, placement, and possession of bird traps without the appropriate authorization.

### Biological Background

This section describes the biological background for this species and provides context for the following sections. It focuses on the habitats that support essential behaviors for the southeastern American kestrel, threats faced by the species, and what constitutes significant impairment and disruption of essential behaviors.

The southeastern American kestrel (*Falco sparverius paulus*) is a non-migratory subspecies of the American kestrel found in sandhill and open pine savannahs, scrub, pastures, and fields in central and north Florida (see [Distribution and Survey Methodology](#)). Males and females are sexually dimorphic: males have blue-gray wings and a rufous tail whereas females have barred black and rufous wings and tail. Juveniles are similar in appearance to adults with heavier streaking on chest, though juveniles are difficult to distinguish from female adults (Smallwood and Bird 2020).

The southeastern American kestrel is one of two subspecies found in Florida. The northern subspecies (*F. S. sparverius*) migrates to Florida during the nonbreeding season. The two subspecies cannot reliably be distinguished by plumage in the field (Collopy 1996), and identification of southeastern American kestrels can only be confirmed when the migrant subspecies is not in Florida (April – August, although some migrants may still be in Florida in early April; Fink et al. 2020).

In Florida, the southeastern American kestrel breeding season extends from March 1 to July 31, although young have been known to fledge as late as early August (Smallwood and Bird 2020, FWC unpublished data).

Southeastern American kestrels nest in cavities created by other species, where females typically lay 3 to 5 eggs per clutch. Incubation lasts for 29 to 31 days, and young fledge 28 to 30 days after hatching (Smallwood and Bird 2020). Newly fledged American kestrels may use the nest cavity for roosting for up to 12 nights (Balgooyen 1976), and adults continue to feed young up to 12 days post-fledging (Bird and Palmer 1988).

### **Habitat Features that support essential behavioral patterns**

The southeastern American kestrel (hereafter, kestrel) requires large, connected areas of Suitable Foraging Habitat (see [definition](#)) to successfully breed and raise young. Foraging habitat characteristics include open, low vegetation dominated by grasses, minimal tree canopy cover (0-25%), and available perches for hunting (Smallwood and Collopy 2009, Miller et al. 2019). Sandhill habitat features that support red-cockaded woodpeckers (*Leuconotopicus borealis*) also support kestrels (Gault et al. 2004). Kestrels prefer frequently burned sandhill communities but will also use grassland, pasture, and agricultural areas (Bohall-Wood and Collopy 1986, Smallwood and Bird 2020) and recently burned scrub consisting of low scrub oaks (*Quercus* spp.) with interspersed sandy patches (Beatty et al. 2020). Kestrels also forage within ephemeral wetlands embedded in uplands during periods when the wetlands are dry, given the area is open with low vegetation (Jennifer Myers, FWC, personal communication).

Kestrels mainly hunt by searching for prey from a perch and will use natural and human-made structures (e.g., utility wires, irrigation structures, buildings, fences, and poles) as perches. Kestrels can also hunt via hovering in place; however, this method demands more energy compared to perch hunting (Rudolph 1982). Southeastern American kestrels prey mostly on grasshoppers and lizards, but also consume other invertebrates and occasionally small mammals (Bohall-Wood and Collopy 1986).

Kestrels are obligate secondary cavity nesters; they mostly depend on woodpeckers to excavate cavities for nesting and roosting. However, they will also use cavities caused by rot or fallen limbs. Excavated nest cavities are usually in dead pine and oak trees. Nesting can occur in cavities in living pines (Gault et al. 2004) but rarely occurs in living oaks (Smallwood and Bird 2020). Kestrels readily use nest boxes, though hatching success is low if nest material is not supplied (Varland and Loughin 1993). Kestrels have also been documented nesting in building eaves, wooden utility poles, and metal transmission cross-arms (Smith et al. 1972, Beasley and Parrish 2009, Smallwood and Collopy 2009, Tracey and Miller 2018). Nest cavities are often reused the following breeding season (Gault et al. 2004, Katzner et al. 2005) and are used as roost sites during the non-breeding season (Toland and Elder 1987, Health and McClure 2017).

Kestrels maintain territories during the breeding season. Territories may overlap depending on habitat quality and kestrel density (Smith et al. 1972). Young kestrels tend to disperse to Suitable Foraging Habitat (see [definition](#)) near their natal site (Miller and Smallwood 1997). Territory size for American kestrels is not widely studied (Smallwood and Bird 2020), but observations range from an average diameter of 0.41 mi (0.66 km; in Jamaica; Cruz 1976), 0.50 mi (0.80 km; in Utah; Smith et al. 1972), and 1.5 mi (2.41 km; in Michigan and Wyoming; Craighead and Craighead 1956). The variation in territory size may be due to prey abundance, habitat quality, nest cavity availability, and breeding pair density (Village 1982, Bowman and Bird 1986, Smallwood and Bird 2020). In Florida, Bohall-Wood and Collopy (1968) found that in high quality habitat, such as sandhill, kestrels were observed most frequently on territories of 124 ac (50 ha), but in lower quality habitat, a kestrel pair may require a larger foraging area.

### **Threats**

Southeastern American kestrels have experienced an estimated population decline of 82% in north central Florida since the 1940s (Hoffman and Collopy 1988). More recently, nest box occupancy rates in a long-term study site in Levy and Marion counties declined by over 50% (Smallwood et al. 2009a). A single cause has not clearly been identified for kestrel population declines (Smallwood et al. 2009a, McCure et al. 2017), and declines are likely a combination and interaction of many threats. As noted in [A Species Action Plan for the](#)

[Southeastern American Kestrel](#) (FWC 2013), primary threats include habitat loss, habitat degradation from fire suppression, and habitat fragmentation. Fire suppression reduces habitat quality and quantity (i.e., via mid-story encroachment) and thus reduce available suitable nest sites (i.e., cavities) for kestrels (Smallwood and Collopy 2009). Habitat fragmentation has both large-scale and small-scale impacts on kestrels. In Florida, habitat fragmentation at the territory scale (0.31-mi radius) negatively influences persistence of breeding pairs at the site (Brown et al. 2013). In the migratory subspecies, breeding pairs are less likely to occupy nest boxes in small habitat-patches compared to large ones (Smallwood et al. 2009b). At larger scales, fragmentation means that kestrels are unlikely to colonize vacant habitat, due to their relatively short dispersal distances in Florida (median <3 mi, Miller and Smallwood 1997).

Human-related disturbance is an additional threat for kestrels. American kestrels have shown tolerance of brief disturbances (e.g., activities related to scientific study including opening nest boxes and handling chicks; Smallwood 2016). However, continuous human disturbances have been correlated with increased female stress and lower productivity (Strasser and Health 2013). When combined with food-stress, even brief disturbances near the nest cavity cause lower productivity (Carpenter 1993). Stys (1993) recommends a 490-ft buffer (150-m; rounded from 492 ft) around cavities with active kestrel nests to avoid disturbing the breeding pair. Human-related disturbances within 490 ft of an Active Nest Cavity are anticipated to significantly disrupt kestrels' ability to breed and thus expected to cause take via harassment.

In addition to threats described above, American kestrels are vulnerable to secondary poisoning by certain rodenticide and, agriculture pesticides, as well as sensitivity to flame retardants used in manufacturing consumer products (Bird 2009, Fernie et al. 2009, Smallwood and Bird 2020). Pesticides also reduce the kestrel's main prey base (Smallwood and Bird 2020). Kestrels are also vulnerable to collisions with vehicles (Deem et al. 1998) and windows (Hager 2009). The [Species Action Plan for Southeastern American Kestrel](#) (FWC 2013) includes actions to address many of the threats facing the species.

### **Potential to Significantly Impair Essential Behavioral Patterns**

Kestrels depend on cavities for nesting and sheltering. Removal of Active Nest Cavities (see [definition](#)) directly harms eggs and young. Removal of previously used nest cavities can result in take via harassment by significantly disrupting breeding and sheltering activities. Disturbance near Active Nest Cavities during the breeding season can result in take via harassment by lowering productivity and significantly disrupting breeding. Southeastern American kestrels require large areas of Suitable Foraging Habitat (see [definition](#)) within their breeding territory; significant habitat modification that reduces available habitat within their breeding territory can cause take by impairing the essential behaviors of foraging and breeding.

### **Take of Southeastern American Kestrels**

This section describes what constitutes take, as defined in Chapter 68A-27, F.A.C., of southeastern American kestrels (see [Current Protections](#)). For ways to avoid take (and thus avoid the need for an FWC permit), see [Measures to Avoid Take](#). Take of kestrels can be either incidental or intentional. **Incidental take** of state-Threatened species is take that is incidental to, and not the purpose of, carrying out an otherwise lawful activity, and it is prohibited without an incidental take permit or other authorization. Accidental death or injury of a kestrel caused by construction activity is an example of incidental take. **Intentional take** is take that is not incidental to an otherwise lawful activity and is prohibited without a permit. For southeastern American kestrels, intentional take permits may be issued for scientific collecting and falconry. Capturing and handing kestrels for research is an example of intentional take requiring a [scientific collecting permit](#).



Figure 1: Examples of Active Nest Cavities. Photographs: FWC/FWC Permit Files

Defining take for the southeastern American kestrel requires an understanding of features that support kestrel breeding, feeding, and sheltering. The following terms define those key features:

- **Suitable Cavity:** Suitable Cavities are hollow spaces within a tree or man-made structure that can support kestrel breeding and sheltering during or outside of the breeding season. Suitable Cavities are usually unobstructed by vegetation with an entrance hole roughly 3 in in diameter and located at least 10 ft (3 m) from the ground. Suitable Cavities can be found in living or dead trees, most commonly pine, but may also be in dead oak, cabbage palm, or decaying limbs on live trees (see [Figure 1](#)). Examples of man-made structures that support Suitable Cavities include building eaves, wooden power poles, and nest boxes. Less common but documented locations of Suitable Cavities for kestrels include the cross-arm of large metal transmission lines (Maney and Parrish 2007, Beasley

and Parrish 2009) and the bottom of monk parakeet (*Myiopsitta monachus*) stick nests (Tracey and Miller 2018).

- **Active Nest Cavity:** A Suitable Cavity is considered an Active Nest Cavity while it supports breeding, which occurs from the point of cavity selection to incubation and rearing of dependent chicks. Prior to eggs being laid during the breeding season (March 1 to July 31), cavity selection can be determined if one or both kestrels are seen entering, exiting, or sitting inside the cavity.



Figure 2: Example of Suitable Foraging Habitat. FWC photo by Craig Faulhaber.

- **Inactive Nest Cavity:** After the young have fledged or once the breeding season is over, an Active Nest Cavity is considered an Inactive Nest Cavity. Kestrels will re-use Inactive Nest Cavities in multiple subsequent breeding seasons and will use Inactive Nest Cavities outside of the breeding season for sheltering. Inactive Nest Cavities are valuable if kestrels continue to occupy that territory.
- **Suitable Foraging Habitat:** Suitable Foraging Habitat is found in the following landcover classes: high pine and scrub (scrub 1210, upland coniferous 1230, sandhill 1240), mowed grass (1810), low intensity urban (urban open pine 182112, grass 18213), rural (rural open pine 18312, agriculture - cropland/pasture 18331). Within the landcover types above, Suitable Foraging Habitat consists of either (1) open, low vegetation ( $\leq 10$  in) dominated by grasses or (2) low scrub oaks with interspersed sandy patches. In pine-dominated forests or sandhill communities, canopy cover in Suitable Habitat is less than 40%, with 25% or less being optimal (i.e., on an aerial image, the ground is easily visible between trees; [Figure 2](#)). The landcover terminology used above comes from the [Florida Landcover Classification System](#) (Kawula and Redner 2018), which crosswalks to the Florida Land Use Cover and Forms Classification System (FLUCCS).
- **Habitat Use Centroid:** The center point of documented kestrel foraging use. This is the average position of observed kestrel locations recorded from surveys (see [Appendix A](#)). The Habitat Use Centroid is used to estimate the location of a kestrel territory and its associated Suitable Foraging Habitat.

**Take** of kestrels includes any of the following:

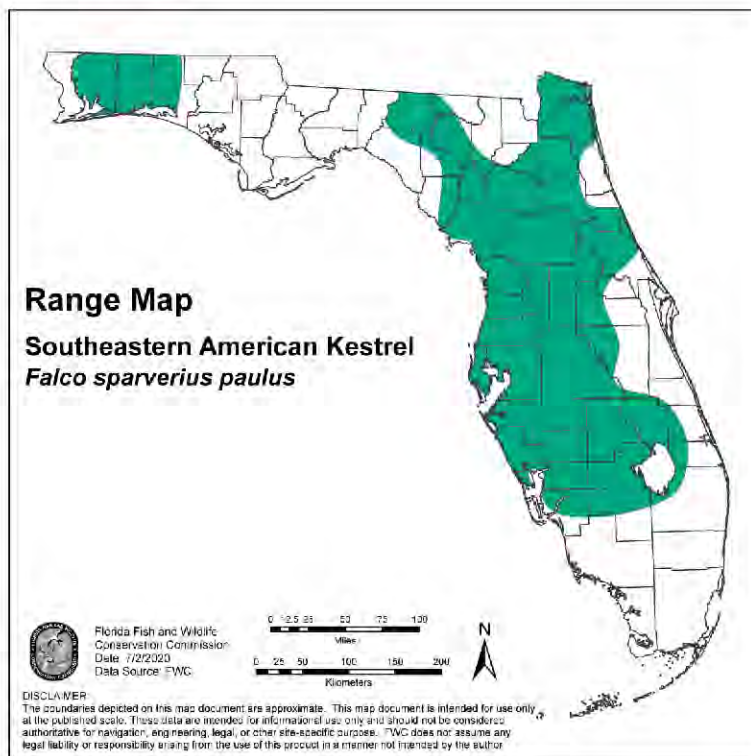
1. Causing injury or death of kestrel adults, eggs, or young.
2. Removing an Active Nest Cavity during the breeding season.

3. Removing an Inactive Nest Cavity (if the cavity is in a man-made structure, see [Other Authorizations for Take](#)).
4. Disturbances within 490 ft (150 m) of an Active Nest Cavity are expected to cause take by significantly disrupting or impairing breeding, unless included in [Examples of Activities Not Expected to Cause Take](#).
5. Capturing, handling, or collecting kestrels or their eggs. Examples include banding, attaching auxiliary markers to, and taking blood or other biological samples from kestrels.
6. Significant modification of Suitable Foraging Habitat is expected to cause take. To determine whether an activity will result in significant habitat modification, see [Appendix A](#). Activity that results in reduction of Suitable Foraging Habitat to less than 124 ac (50 ha) within a 0.31-mi (0.50-km) radius around the Habitat Use Centroid is expected to cause take, unless the Suitable Foraging Habitat within the radius was already less than 124 ac, in which case a reduction in foraging habitat does not constitute take. Suitable Foraging Habitat within the radius includes both on-site and off-site habitat. Activities significantly modify kestrel habitat include, but are not limited to, clearing, grading, paving, bulldozing, digging, and construction.

## Distribution and Survey Methodology

The map represents the principal geographic range of the southeastern American kestrel based on suitable habitat and known breeding locations. This map is informational only and is not for regulatory purposes.

**Counties:** Alachua, Bradford, Charlotte, Citrus, Clay, Collier, Columbia, DeSoto, Dixie, Duval, Flagler, Glades, Gilchrist, Hamilton, Hardee, Hendry, Hernando, Highlands, Hillsborough, Indian River, Lafayette, Lake, Lee, Levy, Madison, Manatee, Marion, Martin, Nassau, Okaloosa, Okeechobee, Orange, Osceola, Palm Beach, Pasco, Pinellas, Polk, Putnam, Santa Rosa, Sarasota, Seminole, Sumter, Suwannee, St. Johns, St. Lucie, Taylor, Volusia, and Walton.



### Recommended Survey Methodology

Surveys are not required but are highly recommended in Suitable Foraging Habitat to determine if southeastern American kestrels are present and whether an incidental take permit is needed. If southeastern American kestrels are not detected through surveys conducted in accordance with the methodology described below, FWC review or coordination is not needed.

Due to the similar appearance of the migratory American kestrel and the southeastern American kestrel, surveys from April to August are recommended. However, when designing and planning a project, please note that southeastern American kestrels begin breeding in March and may have an Active Nest Cavity as early as March 1<sup>st</sup>. If surveys must take place outside of the recommended survey window (April to August),

please note that all kestrels observed shall be considered southeastern American kestrels. Surveys are valid until March 1<sup>st</sup> of the following breeding season.

A minimum of **3 surveys**, with at least 4 to 7 days between each survey, is strongly recommended to determine kestrel use of the project site and to provide sufficient information during the permitting process, if permits are needed.

Survey for kestrels, Suitable Cavities, and Active Nest Cavities (see [definitions](#)) by walking 330-ft (100-m) interval transects. The appropriate distance between transects may vary depending on visibility at the site, with transects spaced closer together if forested edges or other obstructions reduce visibility or spaced farther apart if open habitat allows kestrels to be seen at greater distances. If road coverage is extensive with good visibility, transects may be surveyed from a vehicle at a speed of no more than 25 mi (40 km) per hour. Roadside transects may be used if the routes pass through all potential kestrel habitat on the site, and the habitat along the road transects is open enough to allow sighting of individual birds at considerable distances. Surveys on foot are recommended to locate and confirm Active Nest Cavities. Surveys should be conducted during the morning hours, from sunrise to 3-4 hours past sunrise on calm, clear days.

- Record location, date, starting and ending time, observer(s), and weather conditions. Weather conditions that could affect surveys should be recorded: visibility, wind, rain, and temperature.
- When a kestrel is observed, use binoculars and/or a spotting scope to verify identification, record kestrel perch location (GPS or with a rangefinder and reference point) and breeding behavior (e.g., copulation, feeding), sex and age (adult or juvenile). Plot location(s) on map.
  - Kestrels that fly over without landing should be noted but not recorded as a point.
  - Kestrels hunting via hovering should be recorded (GPS location) to determine the Habitat Use Centroid.
- Record GPS coordinates of cavities and classify as a Suitable Cavity, Active Nest Cavity, or Inactive Nest Cavity (see [definitions](#)). Note that man-made structures should be included in the survey when these structures contain cavities. Plot location(s) on map.
- All Suitable Nest Cavities should be surveyed for kestrel activity between March 1<sup>st</sup> and July 31<sup>st</sup>, (the breeding season).
  - An Active Nest Cavity can be confirmed by observing kestrels entering, exiting, or bringing food to the cavity. If you suspect nesting in an area, minimize disturbance while searching. If kestrels display distressed behaviors, such as alarm calls or circling flights, or if kestrels are perched with food that they are not consuming, back away from the area until normal behavior resumes. Observe with binoculars or scope and watch for kestrels entering and exiting a cavity. Kestrels are more active at the nest cavity at sunrise. Note that the breeding season is March 1<sup>st</sup> – July 31<sup>st</sup>, which differs from the survey window.
  - If an Active Nest Cavity is confirmed, surveyors should leave the area quickly and quietly.
  - Active Nest Cavities can be confirmed by kestrel behavior (e.g., entering or exiting the cavity), however, if activity is unclear, one can confirm with a portal nest camera. If an adult is seen in the cavity, the cavity is considered active. Do not attempt to flush the adult to determine if eggs or young are present.
- Repeat the survey at least two more times during the survey season with at least 4-7 days between surveys. Three surveys are recommended even if kestrels are not seen in previous surveys. If kestrels are not documented on site in any survey during the survey season, no further action is needed. Surveys results can be used until the start of the next breeding season (March 1st).
- Map kestrel sightings (kestrels on perches or hunting via hovering, and Active Nest Cavities) to determine Habitat Use Centroid (see [Appendix A](#)).

## Recommended Conservation Practices

Recommended conservation practices are general measures that could benefit the species but are not required. For additional actions that benefit kestrel conservation, please see the [Species Action Plan](#) (FWC 2013).

- Reduce or avoid the use of pesticides, rodenticides, insecticides, and herbicides in kestrel foraging habitat to the extent practicable, especially during the breeding season. Use all products according to label instructions. Pesticides can contaminate or possibly limit the amount of food available for kestrels. American kestrels that have ingested low doses of rodenticides (similar to levels found in scavenged animals) have decreased blood clotting time and reduced fitness, especially if repeatedly exposed (Rattner et al. 2020).
- Maintain low vegetation heights beneficial for kestrel foraging through prescribed burning, prescribed grazing, or mowing.
  - For mowing, rotational mowing of strips creates a combination of taller, dense vegetation and open areas which increases prey numbers (Stys 1993, Sheffield et al. 2001).
  - Burning on a 2 to 3-year rotation will maintain suitable foraging habitat in sandhill and open pinelands, but increased frequency may be needed based on the vegetation on-site.
  - In scrub, stands less than 10 years old should be maintained to have a scrub height of less than 6 ft (2 m) and retaining snags with a diameter at breast height (DBH) greater than 10 in (25 cm) will increase likelihood of kestrel occupancy (Beatty et al. 2020).
- Minimize the amount of foraging habitat converted to more intensive agricultural land uses (e.g., row crops).
- Retain snags in Suitable Foraging Habitat for perches and nest cavities. Prior to prescribed fires, rake around snags to minimize loss of potential nesting sites, especially if the snag is currently occupied by kestrels.
- Maintain at least 2 to 5 perches per ac (4 perches per ha).
  - Optimal perches provide a clear, unobstructed view of foraging habitat and allow kestrels to hunt efficiently. Optimum perch height ranges from 23 to 33 ft (7 to 10 m), however kestrels will use lower perches, such as fence posts, in landscapes that lack taller options (Kim et al. 2003). Examples of optimal perches include utility poles, distribution lines, center pivot irrigation structures, dead trees (snags), and exposed tree limbs.
- Place, monitor, and maintain kestrel nest boxes in Suitable Foraging Habitat (see [Appendix B](#) for information on next box design, placement, monitoring, and maintenance).
  - Nest box monitoring is optional, although it provides important information about kestrel populations. Follow the recommended protocol ([Appendix B](#)) for voluntary monitoring and reporting to [American Kestrel Partnership](#).
- Manage property to benefit kestrels. For private landowners interested in attracting and managing habitat for kestrels on their properties, the FWC offers Florida's Safe Harbor Program, a voluntary conservation incentive plan, which provides regulatory assurances against future land restrictions in exchange for voluntarily implementing management practices. The FWC's Landowner Assistance Program is also a resource for wildlife habitat management guidance. For more information on these programs, visit [MyFWC.com/conservation/terrestrial/safe-harbor](http://MyFWC.com/conservation/terrestrial/safe-harbor) and [MyFWC.com/conservation/special-initiatives/LAP](http://MyFWC.com/conservation/special-initiatives/LAP)
- For utility companies:
  - When replacing man-made structures that have Suitable Cavities, provide a nest box or retain the cavity portion of the structure and affix it to the new structure. For example, when replacing utility poles that contain Suitable Cavities:



- Leave the utility pole up, if safe to do so (wooden utility poles with excavated cavities do not require annual maintenance),
- Cut the cavity portion out of the pole and affix it to the replacement pole, or
- Provide a kestrel nest box. Nest boxes must be filled with woodchips or pine straw and maintained annually (see [Appendix B](#)).
- In suitable habitat with powerlines, install and maintain nest boxes at least 0.50 mi (0.80 km) apart. Nest boxes do not have to be monitored but should be inspected annually to replenish woodchips (2 to 3 in [5 to 7.6 cm] deep) as needed.
- When designing solar fields within kestrel range:
  - Retain Suitable Foraging Habitat to support kestrels by maintaining open grass areas (<10 in [25 cm] tall) with grazing or mowing. Habitat between solar panel rows is not Suitable Foraging Habitat, as it is unclear if breeding kestrels utilize these grassy strips. Grass areas retained as Suitable Foraging Habitat should be large and open, especially if adjacent to other large tracts of Suitable Foraging Habitat.
  - Place a nest box or wooden utility pole with an excavated cavity in an area with at least 124 ac (50 ha) of Suitable Foraging Habitat within a 0.31-mi (0.50-km) radius.
- Coordinate with organizations and agencies (e.g., managed public lands, local Audubon chapters) to install old wooden poles in Suitable Foraging Habitat or to allow nest boxes to be mounted on existing utility poles in Suitable Foraging Habitat.
- When installing LED lights, use warm-toned LED lights (2200K-3000K) wherever possible to avoid negative impacts to wildlife (Dudley et al. 2015).

## Measures to Avoid Take

### Avoidance Measures that Eliminate the Need for FWC Incidental Take Permitting

The following measures will eliminate the need for an FWC incidental take permit. For more information on projects that may cause intentional take (e.g., capturing and handling for research, intentional take to ensure human safety), please see [FWC Permitting: Intentional Take](#). Projects may avoid incidental take by:

- Avoiding acts that can kill or injure kestrels or eggs,
- Maintaining a 490-ft (150-m) buffer around Active Nest Cavities during the breeding season (March 1 to July 31) to avoid disturbance,
- Retaining Active and Inactive Nest Cavities in natural structures,
- Maintaining at least 124 ac (50 ha) of Suitable Foraging Habitat within a 0.31-mi (0.50-km) radius of a Habitat Use Centroid.

### Examples of Activities Not Expected to Cause Take

This is not an exhaustive list of exempt actions. Please contact FWC staff at the appropriate [regional office](#) if you are concerned that you could potentially cause take.

- Conducting surveys for kestrels in accordance with [Recommended Survey Methodology](#).
- Monitoring kestrel nest boxes in accordance with [Appendix B](#): Kestrel Nest Box Placement and Monitoring.
- Mowing within the 490-ft (150 m) buffer of an Active Nest Cavity.
- Routine vegetation maintenance activities within existing utility rights-of-way within 490 ft (150 m) of an Active Nest Cavity, provided the activity is short in duration (1 hour or less).
- Repairs and maintenance on utility lines within 490 ft (150 m) of an Active Nest Cavity, provided the activity is short in duration (1 hour or less) and does not block the cavity entrance.
- Routine maintenance of roads, such as mowing, culvert and sign maintenance, line painting, and other short duration (1 hour or less) activities within 490 ft (150 m) of an Active Nest Cavity. This

does not include road expansion (i.e., creating new lanes, road widening), grading/resurfacing existing roads, or paving an unpaved road.

- Standard vehicular and pedestrian traffic on roads near Active Nest Cavities.
- Take of non-listed migrant American kestrels (*F. s. sparverius*) for falconry, in accordance with Rule 68A-9.005, F.A.C., which specifies birds must be captured between September 15<sup>th</sup> and January 15<sup>th</sup>.
- Activities within 490 ft (150 m) from an Active Nest Cavity that are similar in nature, size, duration, and intensity to activities already occurring in comparable proximity. To ensure new activities will not significantly disrupt essential behaviors, existing activities should be carefully documented to demonstrate that new activities are similar.
- Activity that results in reduction of Suitable Foraging Habitat to less than 124 ac (50 ha) within a 0.31-mi (0.50-km) radius around the Habitat Use Centroid ([Appendix A](#)), where the Suitable Foraging Habitat within the radius is already less than 124 ac.

### **Florida Forestry Wildlife BMPs and Florida Agricultural Wildlife BMPs**

- Agriculture, as defined in Section 570.02, F.S., conducted in accordance with Chapter 5I-8, F.A.C., and the wildlife best management practices (BMPs) adopted in Rule 5I-8.001 and 5M-18.001, F.A.C., by the Department of Agriculture and Consumer Service pursuant to Section 570.94, F.S., is authorized and does not require a permit authorizing incidental take despite any other provision of Rule 68A-27.007 or 68A-27.005, F.A.C.
- Participation in the [Florida Forestry Wildlife BMPs](#) and [Florida Agricultural Wildlife BMPs](#) program and implementation of these BMPs provides a presumption of compliance with regard to incidental take of kestrels.

### **Other Authorizations for Take**

- Activities within an airport property in accordance with Rule 68A-9.012, F.A.C.
- As described in 68A-27.007(2)(c), F.A.C., land management activities (e.g., prescribed fire, mechanical removal of invasive species, mowing, disking, roller chopping, and herbicide application) that benefit wildlife and are not inconsistent with FWC Management Plans are authorized and do not require a permit authorizing incidental take.
- Vegetation removal or trimming in the linear right of way for power restoration. This applies only in cases where there is an immediate danger to the public's health and/or safety (including imminent or existing power outages that threaten public safety, or in direct response to an official declaration of a state of emergency by the Governor of Florida or a local government entity), and only to non-routine removal or trimming of vegetation within the linear right of way, in accordance with a vegetation management plan that meets applicable federal and state standards. If conducted under these circumstances, no FWC take permit is required.
- Removal or modification of man-made structures (e.g., utility poles, abandoned buildings) used by kestrels is authorized without a permit, provided the removal is conducted in accordance with the [FWC's policy on state-listed species and man-made structures](#), found in Florida's Imperiled Species Management Plan (ISMP). In accordance with the policy, removal or modification of the structure is authorized without a permit, provided that:
  - An approved Wildlife/Habitat Management Plan (see [ISMP](#)) is in place for the area in which the activity will occur, or
  - At least 14 days prior notification is provided to the [FWC](#) Wildlife Diversity Conservation Biologist in the region where the activity will occur, no eggs or dependent young are present, and the activity is conducted in such a way to avoid direct physical injury to animals.
- Maintenance or removal of nest boxes is authorized without a permit, provided the repairs or removal occur outside of the breeding season (March 1st to July 31st) when the nest is inactive. This

authorization does not apply to removal of nest boxes installed as mitigation. Permittees needing to remove a nest box installed for mitigation under a valid FWC permit, should contact the [FWC's Protected Species Permitting Office](#).

- To encourage installation of kestrel nest boxes for conservation, **take via significant habitat modification** is authorized within a 0.31-mi (0.50-km) radius of kestrel nest boxes or other cavities installed for the expressed purpose of attracting kestrels under the following circumstances:
  - Nest box installation is coordinated with FWC or a partner program. The nest box is registered with FWC as a Voluntary Conservation Kestrel Nest Box (for instructions how to locate registered nest boxes, see [Appendix B](#)), and annual monitoring data is submitted to FWC; or
  - The nest box is installed on a utility company right-of-way. These nest boxes are visible and apparent on the utility poles, and their locations do not need to be reported by the utility company to FWC.

Significant habitat modification is not authorized within 0.31-mi (0.50-km) radius of kestrel nest boxes installed for mitigation. For a map of nest boxes installed for mitigation, please visit <https://geodata.myfwc.com/pages/upland>.

## Coordination with Other State and Federal Agencies

The FWC participates in other state and federal regulatory programs as a review agency. During review, FWC staff identifies and recommends measures to address fish and wildlife resources to be incorporated into other agencies' regulatory processes. FWC staff provides recommendations for addressing potential impacts to state listed species in permits issued by other agencies, including comments on avoidance and permitting for kestrels. If permits issued by other agencies adequately address all the requirements for issuing a state-Threatened species take permit, the FWC will consider these regulatory processes to fulfill the requirements of Chapter 68A-27, F.A.C., with a minimal application process. This may be accomplished by issuing a concurrent take permit from the FWC, by a memorandum of understanding with the cooperating agency, or by a programmatic permit issued to another agency. These permits would be issued based on the understanding that implementation of project commitments will satisfy the requirements of Rule 68A-27.003 and 68A-27.007, F.A.C.

### Review of Land and Water Conversion Projects with State-Listed Species Conditions for Avoidance, Minimization and Mitigation of Take

- FWC staff, in coordination with other state agencies, provides comments to federal agencies on federal actions, such as projects initiated by a federal agency or permits under review by a federal agency.
- FWC staff works with landowners, local jurisdictions, and state agencies such as the Department of Economic Opportunity on large-scale land use decisions, including long-term planning projects like sector plans, projects in Areas of Critical State Concern, and large-scale comprehensive plan amendments.
- Conservation benefit as defined in the [ISMP](#) may be accomplished through avoidance, minimization, and mitigation measures outlined in an Environmental Resource Permit, provided sufficient Suitable Cavities and Suitable Foraging Habitat occur on the mitigation site, and there is a commitment to manage the habitat in a manner suitable for kestrels.

## FWC Permitting: Incidental Take

According to Rule 68A-27.001, F.A.C., incidental take is take that is incidental to, and not the purpose of, carrying out an otherwise lawful activity. Activities that result in impacts to kestrels can require an incidental take permit from the FWC (see above for activities that do not require a permit). Incidental take permit

applications are available on the [Protected Species Permitting Website](#), currently under the permit name “migratory bird nest removal.” The applicant must be the landowner, or an agent designated in writing by the landowner.

In addition to state permits, the applicant is responsible for acquiring any necessary local or federal authorizations. Federal permits may be required from the U.S. Fish and Wildlife Service to comply with the Migratory Bird Treaty Act (16 USC 703-712). For example, removing an active nest (i.e., a nest with eggs or young) may require a federal permit in addition to the state permit. Please be aware that the FWC typically does not issue permits for removal of active nests except in situations involving health and human safety, and issuance of a state permit does not constitute federal authorization.

Permits may be issued when there is a scientific or conservation benefit to the species and only upon showing by the applicant that that the permitted activity will not have a negative impact on the survival potential of the species. Scientific benefit, conservation benefit, and negative impacts are evaluated by considering the factors listed in Rule 68A-27.007(2)(b), F.A.C. These conditions are usually accomplished through a combination of avoiding take when practicable, minimizing take that is unavoidable, and mitigating for the permitted take. This section describes the minimization measures and mitigation options available as part of the incidental take permit process for take of kestrels. This list is not an exhaustive list of options.

### **Minimization Measure Options**

The options below are intended to address the evaluation factors required for consideration when issuing an incidental take permit. These options can lessen the impact of activities, and ultimately may reduce what is needed to achieve a conservation or scientific benefit.

#### **Seasonal, Temporal, and Buffer Measures**

- Avoid conducting project activities during the breeding season (March 1st – July 31st).
- If activities must be conducted during the breeding season within 490 ft (150 m) of Active Nest Cavities:
  - Minimize the noise and duration of activities
  - Avoid activities that block the entrance to the nest or create obstacles as kestrels fly in and out of the nest
- Conduct project activities during daylight hours to avoid bright lighting and disturbance within 490 ft (150 m) of Active Nest Cavities.

#### **Design Modification**

- Avoid impacts to natural cavities onsite where possible.
- Avoid impacts to as much Suitable Foraging Habitat as possible within 0.31-mi (0.50 km) radius of the Habitat Use Centroid to minimize the impacts of conversion to incompatible land uses.
- If it is not possible to avoid impacts to as much Suitable Foraging Habitat as possible within 0.31-mi (0.50 km) radius of the Habitat Use Centroid, avoidance of sufficient Suitable Foraging Habitat outside of the radius is beneficial as it provides habitat for the displaced kestrels to use.
- Maintain grassy, open areas (through mowing, prescribed grazing, or prescribed fire) within remaining Suitable Foraging Habitat at less than 10 in (25 cm) after the completion of project activities.

#### **Method Modification**

- Provide pre-construction training about kestrel protections to contractors, sub-contractors, and other project personnel.
- Minimize noise and duration of activities within 490 ft of Active Nest Cavities.

## Mitigation Options

Mitigation is scalable depending on the impact, with mitigation options available for take that significantly impairs or disrupts essential behavioral patterns. This list of mitigation options is not exhaustive. For scenarios that do not fit these categories, stakeholders may contact the [FWC's Protected Species Permitting Office](#) for technical assistance. Programmatic permits are possible and will be evaluated on a case-by-case basis.

### Mitigation for Harassment at an Active Nest Cavity

Disturbance within 490 ft (150 m) of an Active Nest Cavity during the breeding season is expected to result in take via harassment by lowering productivity and significantly disrupting breeding. Examples include construction activities, road construction and widening, and prolonged operation of large or loud machinery. Permit applicants may select *one* of the following options:

1. A financial contribution to the Fish and Wildlife Foundation of Florida's Imperiled Species Permitting Conservation Fund in the amount of \$1,500 per each kestrel pair harassed.
2. Installation and maintenance of 1 kestrel nest box for each kestrel pair harassed. The objective of this mitigation is to offer a supplemental cavity that may outlast a natural one and to add another choice for sheltering and breeding.
  - a. Kestrel nest boxes must be installed in Suitable Foraging Habitat and maintained for minimum of 3 years in accordance with [Appendix B](#).
  - b. Vegetation shall be maintained (e.g., mowing, grazing) within 100 ft of the nest box for the duration of the permit.
  - c. Permittees must maintain the nest box by annually cleaning and replenishing nesting material as described in Appendix B for the duration of the permit.
  - d. During the annual maintenance, evidence of kestrel nesting (i.e., droppings on the interior walls of the nest box) or nesting by another species must be noted and reported in the annual report.
  - e. Permittee must provide an annual report to FWC's Protected Species Permitting Office for the duration of the permit, according to the template provided by the FWC's Protected Species Permitting Office.
3. Off-site mitigation using a kestrel box provided the following conditions are met:
  - a. The off-site mitigation area has been approved by the FWC. This may necessitate a site visit by FWC staff, at the discretion of the FWC.
  - b. The applicant can demonstrate that the site is within the kestrel's range (see Distribution and Survey Methodology) and contains sufficient Suitable Foraging Habitat to support breeding (adjacent properties can count towards sufficient foraging habitat).
  - c. Kestrel nest boxes must be installed in Suitable Foraging Habitat and maintained for minimum of 3 years in accordance with [Appendix B](#).
  - d. Vegetation must be maintained (e.g., mowing, grazing) within 100 ft of the nest box for the duration of the permit.
  - e. Permittees must maintain the nest box by annually cleaning and replenishing nesting material as described in Appendix B for the duration of the permit.
  - f. During the annual maintenance, evidence of kestrel nesting (i.e., droppings on the interior walls of the nest box) or nesting by another species must be noted and reported in the annual report.
  - g. Permittee must provide an annual report to FWC's Protected Species Permitting Office for the duration of the permit, according to the template provided by the FWC's Protected Species Permitting Office.

**Mitigation for Removal of an Inactive Nest Cavity**

Removal of an Inactive Nest Cavity disrupts future breeding behaviors and sheltering outside of the breeding season (see [Other Authorizations for Take](#) for man-made structures). Mitigation options include providing *one* of the following:

1. A financial contribution to the Fish and Wildlife Foundation of Florida's Imperiled Species Permitting Conservation Fund in the amount of \$6,000 per Inactive Nest Cavity removed.
2. Installation of 2 kestrel nest boxes on site, plus \$500 to the Fish and Wildlife Foundation of Florida's Imperiled Species Management Fund.
  - a. Kestrel nest boxes must be installed in Suitable Foraging Habitat and maintained for minimum of 5 years in accordance with [Appendix B](#). For the first 3 years, the kestrel nest boxes must also be monitored in accordance with Appendix B.
    - i. Permittees must maintain the nest box by annually cleaning and replenishing nesting material as described in Appendix B for the duration of the permit.
  - b. Vegetation must be maintained (e.g., mowing, grazing) within 100 ft of the nest box for the 5-year duration of the permit.
  - c. During the annual maintenance, evidence of kestrel nesting (i.e., droppings on the interior walls of the nest box) or nesting by another species must be noted and reported in the annual report.
  - d. Permittees must provide an annual report each year for the 5 years according to the template provided by the FWC's Protected Species Permitting Office. Note that this template differs from the one for harassment at an Active Nest Cavity.
3. Off-site mitigation using 2 kestrel boxes and a financial contribution as described in option 2, provided the following conditions are met:
  - a. The off-site mitigation area has been approved by the FWC. This may necessitate a site visit by FWC staff, at the discretion of the FWC.
  - b. The applicant can demonstrate that the site is within the kestrel's range (see [Distribution and Survey Methodology](#)) and contains sufficient Suitable Foraging Habitat to support breeding. (Adjacent properties count towards sufficient foraging habitat).

**Mitigation for Significant Habitat Modification**

Mitigation for project activities that result in significant habitat modification will be evaluated on a case-by-case basis. Permits will not be issued solely for proposed infrastructure (e.g., roads and utilities) that is part of a larger common development plan, project, plat, or subdivision. Mitigation must address all kestrels impacted through the entire project, development, plat, or subdivision site plan (the development footprint). Mitigation packages may seek to meet either scientific or conservation benefit and may include one of the following options or a combination of options:

**Scientific Benefit**

This section describes research and monitoring activities that provide scientific benefit, per Rule 68A-27.007, F.A.C. Conducting or funding these activities can be the sole form of mitigation for a project.

- Research assessing kestrel population size and movements on utility transmission corridors.
- Research on the effects of conversion of pastures to solar facilities on kestrel occupancy and demography.
- Research assessing the population status, demographics, and reproductive health of kestrels in human-modified landscapes.

**Habitat**

Habitat protection, restoration, or management must be sufficient to counterbalance the take that occurs and provide an additional benefit. For example, if take includes one pair of kestrels, then a restoration project would need to provide sufficient Suitable Foraging Habitat and Suitable Cavities, either on its own or in conjunction with existing suitable habitat, to support at least one pair of kestrels that would not otherwise have been present. Habitat-based mitigation can be either on- or off-site.

- Restoration of sandhill habitat on public or private conservation land large enough to support kestrels and within kestrel range. Restoration activities include prescribed fire, timber thinning, hardwood reduction, removal of invasive plant species, and ground cover restoration.
- On-site preserve areas that protect Suitable Foraging Habitat and provide Suitable Cavities (e.g., nest boxes) for breeding and sheltering, along with a commitment for management with a habitat management plan. Other developed land may contain Suitable Foraging Habitat but should not be included as part of the preservation area. Residential lawns, isolated narrow grassy strips along roads and medians, and areas adjacent to high traffic roads are not Suitable Foraging Habitat and should not be included in on-site preserves for kestrels.
- Short-term or long-term commitment to use habitat management techniques that maintain Suitable Foraging Habitat in areas with sufficient Suitable Foraging Habitat and Suitable Cavities.
- Fee simple acquisition or conservation easements of potential habitat, with a commitment for long-term management and a habitat management plan, in areas within kestrel range with sufficient Suitable Foraging Habitat and Suitable Cavities.

**Financial Contribution**

- A financial contribution to the Fish and Wildlife Foundation of Florida's Imperiled Species Permitting Conservation Fund in the amount of \$20,000 per kestrel pair taken via significant habitat modification.
- The amount of mitigation for this category can be reduced as impacts are reduced through minimization options, or by combining other mitigation options with a financial contribution.

**Information**

- FWC-approved research, monitoring, or educational projects consistent with the [Species Action Plan for Southeastern American Kestrel](#) (FWC 2013). This form of mitigation can be part of a mitigation package but shall not be the sole form of mitigation unless included above under Scientific Benefit.

Table 1: Summary of Mitigation Options

Form of Take	Mitigation Options		
	Combination	Permit Duration	Financial Only (Per nest cavity or kestrel pair)
<b>Harassment of nesting pair</b> (activities within 490-ft buffer of an Active Nest Cavity)	Install and maintain 1 nest box for 3 years ** (no monitoring requirement)	3 years	\$1,500
<b>Removal of Inactive Nest Cavity*</b> (foraging habitat remains)	Install and maintain 2 nest boxes for 5 years + \$500 (monitor only for first 3 years, but maintain all 5 years)	5 years	\$6,000
<b>Significant habitat modification</b> (may also include removal of nest cavity)	1. Scientific benefit, or  2. Habitat restoration, acquisition, or conservation easements, or  3. Combination of two or more of the options below: (a) research, monitoring, educational projects; (b) habitat restoration, land acquisition, or conservation easements; or (c) financial mitigation	Varies	\$20,000

\*Excludes cavities in man-made structures, see [Other Authorizations for Take](#)

\*\* Nest boxes may be placed on-site or FWC approved off-site locations

#### Programmatic Options

- Multi-year or long-term permits are possible and will be considered on a case-by-case basis. Examples include, but are not limited to, large-scale ecological restoration projects or public works projects.

#### Multispecies Options

- Multispecies mitigation options may be available for projects that will also impact gopher tortoises and state-listed species commensal to the gopher tortoise.

## FWC Permitting: Intentional Take

Intentional take is not incidental to otherwise lawful activities. Per Chapter 68A-27, F.A.C., intentional take is prohibited and requires a permit. For state-Threatened species, intentional take permits may only be considered for scientific or conservation purposes (defined as activities that further the conservation or survival of the species taken). Permits are issued for state-Threatened species following guidance in Rule 68A-27.007(2)(a), F.A.C. Intentional take is authorized under certain circumstances that involve risks to



property or human safety, such as on airport property.

## Risks to Property or People

### Intentional Take for Human Safety

- Rule 68A-9.012, F.A.C., describes circumstances under which kestrels may be taken on airport property without further state authorization for an imminent threat to aircraft or human safety.
- Permits for intentional take will be issued only under limited and specific circumstances, in cases where there is an immediate danger to the public's health and/or safety, including imminent or existing power outages that threaten public safety, or in direct response to an official declaration of a state of emergency by the Governor of Florida or a local governmental entity. Applications submitted for this permit must include all information that is required from any other applicant seeking a permit, along with a copy of the official declaration of a state of emergency, if any.

### Aversive Conditioning

- Not applicable for the southeastern American kestrel.

## Scientific Collecting and Conservation Permits

Scientific collecting permits may be issued for the kestrel using guidance found in Rule 68A-27.007(2)(a), F.A.C. Applicants can find guidance for applying for scientific collecting permits on FWC's [Protected Species Permitting Website](#).

**Research activities** requiring a permit include any projects that involve capturing, handling, or marking kestrels; conducting biological sampling; or other activities that may cause take. The information in this section is intended to support the development of complete and sufficient applications.

Scientific collecting permit applications involving **captive possession** for any period of time must include a description of the facility's appropriate resources to accomplish the project's objectives and maintain the animals in a safe and humane manner.

Scientific collecting permit applications for **educational use** of live kestrels must include an evaluation by an independent rehabilitator and a veterinarian demonstrating that the individual cannot be released into the wild, must demonstrate appropriate educational use by describing the activities in which the kestrel is used for education or the exhibits that display the kestrel, and must include information about the ability of the applicant(s) to conduct the educational activities, and their history of performing such activities. Applications should demonstrate that the kestrel will be on public display with the intent of conservation education whenever the facility is open to the public (provided the bird is in good health) or through scheduled tours.

For **possession of dead kestrels, or their parts or infertile eggs**, an applicant must meet appropriate educational use as designated above, except that specimens may be housed in a manner appropriate for their preservation, provided they are still accessible for public use. Permits may be issued to display a specimen if the specimen was obtained via a rehabilitation facility or was encountered dead.

Falconry permits for southeastern American kestrels require an intentional take permit and would only be considered for activities that further the conservation or survival of the species.

Although issuance of a state permit does not depend on the possession of **local or federal authorizations**, permittees must obtain all necessary local and federal authorizations before executing the state permit. Federal permits may be required from the U.S. Fish and Wildlife Service to comply with the Migratory Bird Treaty Act and may be required from the United States Geological Survey (USGS) Bird Banding Lab for banding, color-marking, specific capture methods, sampling of blood or tissues, collection of feathers, and attachment of transmitters or other data gathering mechanisms. Federal salvage permits are also required to collect any dead individuals (i.e., mortality not due to research activities or incidental take from research

activities) or parts of deceased individuals including feathers and tissues.

#### **Considerations for Issuing a Scientific Collecting Permit**

- 1) **Is the purpose adequate to justify removing the species (if the project requires this)?**
  - Permits will be issued if the identified project is consistent with the goal of the [Species Action Plan for the Southeastern American Kestrel](#) (i.e., improvement in status that leads to removal from Florida’s Endangered and Threatened Species List), or addresses an identified data gap important for the conservation of the species.
- 2) **Are there direct or indirect effects of issuing the permit on the wild population?**
  - Applicants must include detailed methods, including measures taken to minimize take. Applications also should include proposed study duration, sample size, and disposition of individuals, as appropriate.
  - Trapping, capturing and handling kestrels may impact the wild populations’ ability to forage, breed, or rear young. Trapping and handling protocols must be included in the permit application and should identify measures to lessen stress for captured individuals and to lessen impacts to kestrel populations.
  - Methodologies for any collection of tissues such as blood should be clearly spelled out, including measures taken to reduce stress/injury to the birds.
- 3) **Will the permit conflict with a program intended to enhance survival of species?**
  - Applications must include clear objectives to ensure that the project does not conflict with other conservation efforts for the species.
  - Coordination with land managers and partners (county, city, state or national) should be addressed in the application to demonstrate that the project will not conflict with other efforts for the species.
  - Applications should identify where trapping or handling will occur (privately owned or public lands).
- 4) **Will issuance of the permit reduce the likelihood of extinction?**
  - Projects consistent with the goal of the Species Action Plan or that fill identified data gaps in species life history or management may reduce the likelihood of extinction.
  - Applications must include clear project objectives and justification of why the proposed research has a scientific or conservation purpose, including how the project advances conservation of the species.
- 5) **Has the applicant sought the opinions or views of other scientists or other persons or organizations having expertise concerning the species?**
- 6) **Is applicant expertise sufficient?**
  - Applicants must have prior documented experience with this or similar species, and applicants should have met all conditions of previously issued permits.
  - The application should describe the qualifications (e.g., experience or training) of all project participants and the resources and facilities available to conduct the proposed work.

#### **Relevant to all Scientific Collecting Permits for the Southeastern American Kestrel**

Permit amendment and renewal applications must be “stand alone” (i.e., include all relevant information on objectives and methods). Applications must include a proposal that addresses all considerations for issuing a scientific collecting permit.

As noted above, scientific collecting permit applications must include detailed qualifications or training for all individuals that will be capturing or handling kestrels. For those likely to submit multiple applications over time, the FWC strongly encourages applicants to upload qualifications as

part of an application for a self-issuing Registered Agent permit in FWC's [online permitting system](#). The FWC also encourages applicants to include qualifications of sub-permittees in the Registered Agent permit.

Any mortality should be reported to the FWC, and specimens shall be properly disposed. A final report shall be provided to the FWC in the format specified in the permit conditions.

## Additional information

Information on economic assessment of Species Conservation Measures and Permitting Guidelines can be found at <http://myfwc.com/wildlifehabitats/imperiled/management-plans/>

## Contact

For permitting questions or to report mortalities, contact the FWC at (850) 921-5990 or [WildlifePermits@myfwc.com](mailto:WildlifePermits@myfwc.com). For more regional information and technical assistance, visit <https://myfwc.com/license/wildlife/protected-wildlife-permits/contacts/>

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## Appendix A. Calculating the Habitat Use Centroid

The Habitat Use Centroid is the average position of observed kestrel locations recorded during three surveys. The Habitat Use Centroid is used to estimate the location of a kestrel territory and its associated Suitable Foraging Habitat, so one can determine if significant habitat modification will occur.

- Plot kestrel sightings from all surveys conducted. Kestrel sightings that are greater than 0.31 mi (0.50 km) away from each other are considered different territories. To determine if a group of sightings are part of one territory, buffer each sighting with an 820-ft (0.25-km) radius. Sightings where the 820-ft buffer intersect are considered a single territory and those locations should be taken together to determine the habitat use centroid.
- Locations can be included in the calculation more than once if kestrels were recorded at that location multiple times over the surveys.
- Calculate the average of the latitudes and the average of the longitudes of the kestrel locations to determine the coordinates of the habitat use centroid.
- Plot the habitat use centroid on the map of the project and draw a 0.31-mi radius around the habitat use centroid to determine the kestrel territory. Determine the total acreage of Suitable Foraging Habitat (see [definitions](#)) within 0.31-mi radius of the Habitat Use Centroid. Although land cover classification maps are helpful in determining suitable habitat, aerial imagery should also be used to confirm habitat such as sandhill and pine woodlands have the appropriate canopy cover. On an aerial image in suitable habitat, trees will be widely spaced enough that the observer should see the ground through the canopy.
- Overlay development plans to determine if take will occur:
  1. Inactive Nest Cavity removed by the project activities, or
  2. Project activities will come within 490 ft of an Active Nest Cavity, or
  3. Reduction of Suitable Foraging Habitat to less than 124 ac within a 0.31-mi radius around the Habitat Use Centroid, given available Suitable Foraging Habitat prior to development is 124 ac or more.
- When calculating the acreage that will remain post-development, include Suitable Foraging Habitat that is off-site as well as on-site within the 0.31-mi radius.

## Appendix B. Kestrel Nest Box Placement and Monitoring

Kestrels readily use nest boxes placed in appropriate habitat. Nest boxes are recommended in areas where Suitable Foraging Habitat is present, but cavities are limited. Kestrels may take a year or two to locate and use boxes. Installation of nest boxes is only recommended if they can be maintained for at least three years.

### Registering Kestrel Nest Boxes

Landowners and other entities interested installing and monitoring nest boxes may be eligible to participate in FWC's Registered Kestrel Nest Box Program. Nest boxes installed and monitored in coordination with FWC as part of this program are classified as Voluntary Conservation Kestrel Nest Boxes. To promote installation of Voluntary Kestrel Nest Boxes in appropriate areas, take via significant habitat modification is authorized within a 0.31-mi (0.50-km) radius of these nest boxes. If considering installation of kestrel nest boxes on your property, please note the following:

- Interested participants should contact [Imperiled@myfwc.com](mailto:Imperiled@myfwc.com) for additional information on participating in this program.
- Registered nest boxes should adhere to the recommendations for nest box placement, monitoring, and maintenance guidelines outlined here.
- Monitoring data will be shared with the FWC.
- Registered box locations will be recorded and available on the FWC Kestrel Nest Box Locator Map (<https://geodata.myfwc.com/pages/upland>).
- Coordination and technical assistance are available to ensure kestrel nest boxes are placed in appropriate habitat.
- A minimum of a 3-year commitment to monitor Volunteer Conservation Kestrel Nest Boxes is requested, and longer-term monitoring is encouraged.

### Nest Box Design

Kestrel nest boxes can be purchased or made and should have the following features:

- Untreated and unpainted wood (best options: cypress, cedar, or pine) at least  $\frac{3}{4}$  of an inch thick.
- Entrance hole 3 in in diameter.
- A sloped roof and drainage holes in the floor to keep the interior dry.
- No perches outside of the box (these may help predators get into the box). An optional perch inside the box, however, may help chicks as they prepare to fledge.
- Ventilation near the roof of the box (e.g., a gap between the side walls and the roof or small holes drilled at the top of the side walls).
- A door, either on the side or on the roof, to allow for cleaning out boxes and adding wood chips.
- A 3-in doorsill to prevent chicks from falling out when the door is opened (optional but recommended if nest checks are done by opening the box).

### Nest Box Maintenance

- Kestrels do not bring nest material into the nest box, therefore providing woodchips (2-3 in deep) on the bottom of the nest box is crucial. Do not use saw dust as a replacement, as chicks can inhale these small particles while consuming food. If you do not put nesting material in the box, kestrels will lay eggs on the bare floor that may be crushed or addled during incubation, resulting in nest failure. **Never install a kestrel nest box without woodchips**, unless it is a segment of a wooden utility pole with an existing woodpecker cavity. In cavities excavated by woodpeckers, the bottom is uneven and therefore the eggs are not on a flat surface.
- Nest boxes should be inspected annually prior to the breeding season (i.e., December – January) to replenish wood chips and to perform any necessary repairs.

- Other designs may also be suitable for southeastern American kestrels (for instance, PVC cylinder boxes on utility poles) as long as nest boxes have nesting material added and replenished, especially within the first three years of the nest box installation. After three to five years, nesting material layer is compacted and will continue to provide a suitable surface for eggs.

### **Nest Box Placement**

Appropriate nest box placement will increase the likelihood of kestrels finding and utilizing the box.

- Place nest boxes in areas with at least 124 ac of Suitable Foraging Habitat within a 0.31-mi radius of the box.
- Mount nest box 10 to 15 ft above ground on a tree or wooden pole.
  - Please note: Installing kestrel boxes on utility poles requires permission from the utility company or private landowner.
- Nest boxes may be mounted to structures or trees with two 3-in screws on the top and bottom of the back of the box. Wire or zip ties can also be used to mount the box but are not recommended on live trees.
- Face kestrel nest boxes away from roads, trees, or other hazards, and ensure the flight path to the opening is unobstructed. If possible, also position opening in southerly or easterly facing direction. Note that facing the opening away from hazards and trees is more important than orientating in a direction.
- Place kestrel nest boxes in open grassy areas at least 164 ft (50 m) and ideally 490 ft (150 m) from dense woodland edges. Placing nest boxes away from woodland borders decreases the likelihood of squirrels and mice occupying boxes (Rohrbaugh and Yahner 1997).
- Maintain low and open vegetation in the area surrounding kestrel nest box (i.e., within 100 ft [30.5 m] of the nest box). Remove tall or encroaching vegetation (such as vines) on or near the mounted kestrel nest boxes, as vegetation allows predators to more easily climb to the nest box. To increase likelihood of box use, perform vegetation maintenance outside of the breeding season.
- If placing nest boxes near a road, use smaller, less trafficked roads (i.e., unsurfaced or rural roads, roads with wide shoulders, roads with lower speed limits).
- For sandhill and woodlands, avoid areas with a well-developed palmetto understory. Tree canopy closure should be 25% or less (see [definitions](#) for Suitable Foraging Habitat).
- When placing multiple nest boxes in an area, space them at least 0.50 mi [0.80 km] apart.
- If red imported fire ant mounds are present at the base of the support structure, consider applying a granular fire ant treatment product. Fire ants can have detrimental effects on nestlings leading to disfigurement and mortality.

### **Monitoring Kestrel Nest Boxes**

A permit is not needed if the following protocol is used when monitoring kestrel nest boxes. Adults, chicks, and eggs should not be touched or handled. For monitoring of kestrel nest boxes, FWC recommends the following protocol:

- Check nest boxes three times during the breeding season: first week of April, first week of May, and the first week of June. If kestrels nest a second time during the breeding season (e.g., the June nest check contains eggs), an optional fourth check in the first week of July may be needed.
- For Florida, three visits spaced one month apart during these timeframes provides enough information to determine kestrel use and whether the nesting attempt was successful with minimal disturbance to the breeding pair (Miller and Fasoli 2014). Nest box checks should be completed during daylight hours in the absence of strong wind and rain.
- Minimize disturbance during the nest check by approaching quietly. If opening a nest box to check



- contents, do so in under five minutes.
- Do not check nest boxes if you can see the chicks peering out from the entrance. These chicks are close to fledging and could prematurely jump out of the nest if disturbed.
  - Cameras are useful tools to check nest boxes with minimal disturbance, especially later in the season when chicks are larger. There are cameras made specifically for checking cavity nests (e.g., red-cockaded woodpecker nests). The camera should only be in the nest cavity for the time needed to check the contents. Do not stand near the nest box for more than 5 minutes.
    - If adult is in the cavity and contents of the nest cannot be seen, remove the camera. The adult may flush once the camera is no longer blocking the entrance, but if it does not, simply record that the adult would not flush.
  - Record species occupying the nest box, number of eggs, and/or young.
  - Record presence/absence of kestrel droppings (successful nests will have white droppings on the walls or appear “whitewashed”).
  - Upload data to American Kestrel Partnership (<https://kestrel.peregrinefund.org/>) to contribute data for tracking trends of kestrels
    - Monitoring data are useful even if boxes are not used.
    - Follow protocol outlined here, not the American Kestrel Partnership protocol, as this protocol is specific to southeastern American kestrel timing.
  - For boxes mounted on a hinged pole that can be pulled down to eye-level, do not pull down the box during the breeding season. The movement may jostle and addle eggs, and could increase likelihood of older young prematurely fledgling, even if a string is placed at the bottom of the box to stabilize the movement. Boxes should be brought down only during cleaning and maintenance.

**Kestrel Nest Box Diagram**

