

# Southeastern American Kestrel

## *Falco sparverius paulus*



Photograph by Jack Rogers.

### Species 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](#) section). 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 with certainty when the migrant subspecies is not in Florida (April – August; Fink et al. 2020).

The southeastern American kestrel breeding season extends from March 1 to July 15, although young have been known to fledge as late as early August (Smallwood and Bird 2020). 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 in 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](#) below) to successfully breed and raise young. Foraging habitat characteristics include open, low vegetation dominated by grasses, minimal tree canopy cover (0-25%), available perches for hunting, and cavities for nesting (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 agriculture (Bohall-Wood and Collopy 1986, Smallwood and Bird 2020) and recently burned scrub (Beatty et al. 2020).

Kestrels hunt by searching for prey from a perch and will use a variety of anthropogenic structures to do so, such as utility wires, irrigation structures, buildings, fences, and poles. The southeastern American kestrel diet consists mostly of grasshoppers and lizards, but they 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 various dead pine and oak tree species. 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; however, nest material must be supplied, or else females will lay eggs on bare wood, resulting in low egg hatching success (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 seasons (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, and territories may overlap with neighbors depending on habitat quality and kestrel density (Smith et al. 1972). Young kestrels tend to disperse to Suitable Foraging Habitat (see [definition](#) below) 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 mile (0.66 kilometer; in Jamaica; Cruz 1976), 0.5 mile (0.8 kilometer; in Utah; Smith et al. 1972), and 1.5 miles (2.41 kilometers; in Michigan and Wyoming; Craighead and Craighead 1956). The variation in territory size may be due to prey abundance, habitat quality, availability of nest cavities, and density of breeding pairs (Village 1982, Bowman and Bird 1986, Smallwood and Bird 2020). In Florida, Hoffman (1983) found that in high quality habitat, such as sandhill, kestrel territory size was about 124 acres (50 hectares), but in lower quality habitat, a kestrel pair may require a larger foraging area.

### **Threats**

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 the [Species Action Plan for Southeastern American Kestrel](#) (FWC 2013), primary threats include habitat loss, habitat degradation from fire suppression, and habitat fragmentation. Fire suppression results in less Suitable Foraging Habitat (i.e., via mid-story encroachment) and changes in the habitat reduces 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-mile radius circle)

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 miles, Miller and Smallwood 1997).

Human-related disturbance is an additional threat for kestrels. American kestrels are tolerant of brief disturbances related to scientific study (e.g., 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 at the nest cavity cause lower productivity (Carpenter 1993). Stys (1993) recommends a 500-foot buffer (150-meter; rounded up from 492 feet) around active kestrel nest cavities to avoid harassment. These guidelines consider harassment to occur from activities within the 500-foot buffer of an active nest, but this distance will be updated in future revisions if additional data become available.

In addition to threats described above, American kestrels are vulnerable to rodenticides, agriculture pesticides, and flame retardants (Bird 2009, Fernie et al. 2009, 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 Disrupt or Impair Essential Behavioral Patterns**

Kestrels depend on cavities for nesting and sheltering. Removal of Active Nest Cavities (see [definition](#) below) 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 also require large areas of Suitable Foraging Habitat (see [definition](#) below) within their breeding territory, and therefore reducing available habitat can result in significant habitat modification by impairing the essential behaviors of foraging and breeding. Impacts that constitute take are described in more detail in the section below.

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

This section describes what constitutes take of kestrels under Chapter 68A-27, F.A.C. (see Current Protections). For ways to avoid take (and thus avoid the need for an FWC permit) please see [Measures to Avoid Take](#). Take of kestrels can be either incidental or intentional. **Incidental take** 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 during construction 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. Intentional take permits include scientific collecting permits and falconry permits. Capturing and handing kestrels for research is an example of intentional take requiring a [scientific collecting permit](#). Intentional take is authorized under certain circumstances involving [risks to property or human safety](#).

The following terms, as defined below, are used throughout these guidelines:

- Suitable Cavity:** Suitable Cavities are hollow spaces within a tree or man-made structure that can potentially 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 inches in diameter and located at least 10 feet 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,



*Figure 1: Examples of Active Nest Cavities. Top right photo from FWC permit application, all others FWC photos.*

- Beasley and Parrish 2009) and the bottom of monk parakeet 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 15), cavity selection can be determined if one or both kestrels are seen entering, exiting, or sitting inside the cavity.
- Inactive Nest Cavity:** After the young have fledged, the 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. Natural cavities that have been used at least once for nesting are valuable even when they are inactive if kestrels continue to occupy that territory.

- Suitable Foraging Habitat:** Suitable Foraging Habitat consists of open, low vegetation ( $\leq 10$  inches) typically dominated by grasses with perch sites available. In pine-dominated forests or sandhill communities, canopy cover is ideally 25% or less (i.e., on an aerial image, the ground is easily visible between trees; [Figure 2](#)). Suitable Foraging Habitat may be found in the following types of habitat: 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). The 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).



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

- Suitable Perch:** Suitable perches provide a clear, unobstructed view of foraging habitat and are necessary for kestrels to hunt efficiently. Optimum perch height ranges from 23 to 33 feet (7 to 10 meters), however kestrels will use lower perches, such as fence posts, in landscapes that lack taller options (Kim et al. 2003). Examples of suitable perches include utility poles, distribution lines, center pivot irrigation structures, dead trees (snags), and exposed tree limbs. Minimum acceptable perch density is 1 to 2 perches per acre.
- Habitat Use Centroid:** The center point of documented kestrel foraging use is referred to as the Habitat Use Centroid. 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:

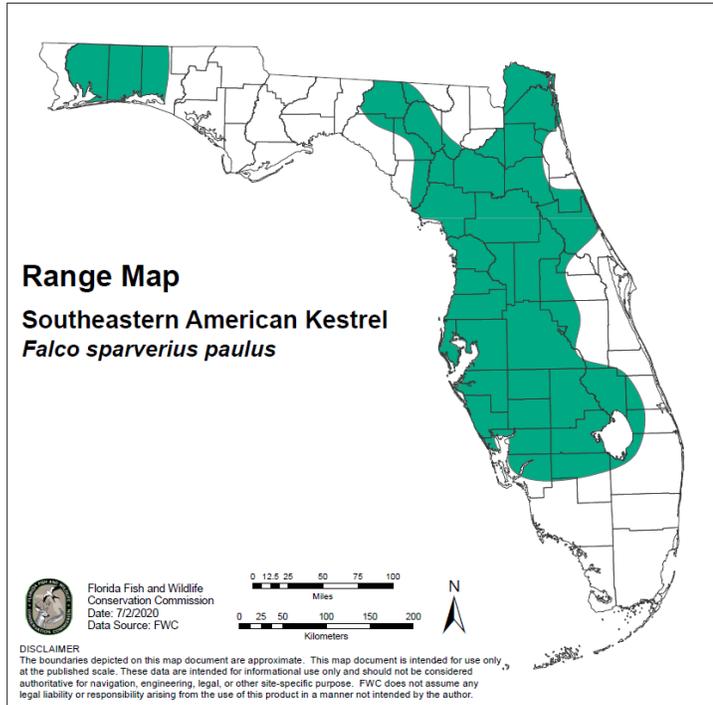
1. Causing injury or death of kestrel adults, eggs, or young.
2. Removing an Active Nest Cavity during the breeding season.
3. Removing an Inactive Nest Cavity (for man-made structures, see [Other Authorizations for Take](#)).
4. Disturbances within 500 feet (150 meters) of an Active Nest Cavity are 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 constitutes take. Banding, attaching auxiliary markers to, and drawing blood or other biological samples from kestrels also constitutes take.
6. Significant modification of Suitable Foraging Habitat is expected to cause take. The process for determining whether an activity results in significant habitat modification is outlined in [Appendix A](#). An activity that results in reduction of Suitable Foraging Habitat to less than 124 acres (50 hectares)

within a 0.31-mile (0.50-kilometer) radius around the Habitat Use Centroid ([Appendix A](#)) is expected to cause take, unless the Suitable Foraging Habitat within the radius was already less than 124 acres. Suitable habitat within the radius includes both on-site and off-site habitat. Activities that cause significant habitat modification include, but are not limited to, clearing, grading, paving, bulldozing, digging, building construction, and site preparation for development.

## 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 for informational purposes 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, Santa Rosa, Madison, Manatee, Marion, Martin, Nassau, Okaloosa, Okeechobee, Orange, Osceola, Pasco, Pinellas, Polk, Putnam, 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 to avoid unauthorized take. If conducted in accordance with the methodology described below and the species is not detected, FWC review or coordination is not needed.

Due to the similar appearance of the migratory American kestrel and the southeastern American kestrel, FWC recommends surveying from April to August. 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.

The FWC strongly recommends at least **3 surveys** with at least 4 to 7 days between surveys to determine kestrel use of the project site and avoid requests for additional information.

### Survey Methods

Survey for kestrels, Suitable Nest Cavities, and Active Nest Cavities (see [definitions](#)) by walking 100-meter (328-foot) interval transects. If road coverage is extensive with good visibility, transects may be completed from a vehicle at a speed of no more than 25 miles (40 kilometers) 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.
- When a kestrel is sighted, 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 of kestrel (adult or juvenile). Plot location(s) on map.
  - Kestrels that fly over without landing should be noted but not recorded as a point.
- Record cavities and classify as a Suitable Cavity, Active Nest Cavity, or Inactive Nest Cavity (see definitions). Note that man-made structures can be included in the survey as cavities. Plot location(s) on map.
- An Active Nest Cavity can be confirmed by observing kestrels entering or exiting the cavity or bringing food to the nest 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 15<sup>th</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. If kestrels are not documented on site in any survey during the survey season, then no further action is needed. Surveys results can be used until the start of the next breeding season (March 1<sup>st</sup>).
- Map kestrel sightings and 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, fungicides and herbicides in kestrel foraging habitat to the extent practicable, especially during the nesting 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 substrate in sandhill and open pinelands, but increased frequency may be needed based on the vegetation on-site.
- 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 suitable perches of least at 2 to 5 perches per acre.
- Place, monitor, and maintain kestrel nest boxes in Suitable Foraging Habitat (see [Appendix B](#) for information on nest box design, placement, and monitoring).
  - Nest box monitoring is optional, although it provides important information about kestrel populations. Follow FWC recommended protocol ([Appendix B](#)) for voluntary monitoring and reporting to American Kestrel Partnership ([www.kestrel.peregrinefund.org](http://www.kestrel.peregrinefund.org)).
- 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. FWC also has a Landowner Assistance Program as 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)
- Recommended conservation practices specific 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 adhere it to the new structure.
    - For example, when replacing wooden utility poles with an existing cavity:
      - Leave the utility pole up if it can be done safely, or
      - Cut the cavity portion out of the pole and affix it to the replacement pole, or
      - Provide a kestrel nest box. Note that wooden utility poles with excavated cavities do not require annual maintenance, however nest boxes must be filled with woodchips or pine straw and maintained (see [Appendix B](#)).
  - In suitable habitat with powerlines, install and maintain nest boxes no closer than 0.50 mile apart. Nest boxes do not have to be monitored but should be inspected annually to replenish woodchips (2 to 3 inches [5 to 7.6 centimeters] deep) as needed.
  - When designing solar fields within kestrel range:
    - Retain Suitable Foraging Habitat to support kestrels by maintaining open grass areas (<10 inches [25 centimeters] tall) with sheep or cattle grazing, or mowing. Note that the habitat between solar panel rows is often too narrow to provide Suitable Foraging Habitat.
    - Place a nest box or wooden utility pole with an excavated cavity in an area with at least 124 acres (50 hectares) of Suitable Foraging Habitat within a 0.31-mile (0.5-kilometer) radius.
- Partner with organizations and agencies (e.g., county parks, state parks, 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) if possible. Although effects of bright LED streetlights on kestrels have not been studied, negative effects have been documented for other 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 visit the intentional take section of these guidelines. Projects may avoid incidental take by:

- Avoiding acts that can kill or injure kestrels or eggs, and
- Maintaining a 500-foot (150-meter) buffer to avoid disturbance around Active Nest Cavities in the breeding season (March 1 to July 15) and
- Retaining Active and Inactive Nest Cavities that are in natural structures, and
- Ensuring that the project does not cause significant habitat modification through reduction of Suitable Foraging Habitat to less than 124 acres (50 hectares) within a 0.31-mile (0.5-kilometer) radius of the Habitat Use Centroid.

### Examples of Activities Not Expected to Cause Take

This is not an exhaustive list of exempt actions. Please contact FWC if you are concerned that you could potentially cause take.

- Conducting surveys for kestrels using the methodology described in the Recommended Survey Methodology section.
- Monitoring kestrel nest boxes in accordance with FWC guidelines ([Appendix B](#)).
- Mowing within the 500-foot (150 meter) buffer of an Active Nest Cavity.
- Routine vegetation maintenance activities within existing power line rights-of-way within 500-foot (150-meter) buffer of an Active Nest Cavity.
- Repairs and maintenance on utility lines that occur within 500-foot (150 meter) buffer of an Active Nest Cavity, provided the activity is short-duration (1 hour or less) and does not block the entrance of the cavity.
- Routine maintenance of roads, such as mowing, culvert maintenance, sign maintenance, line painting, and other short duration activities. 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*) under Falconry Rule 68A-9.005(11)(a)(7), F.A.C. is not expected to cause take of southeastern American kestrels if birds are captured during the period of September 15 – January 15 as outlined in rule.
- Project activities within 500 feet (150 meters) from an active nest cavity which are similar to activities already occurring in comparable proximity to the nest. Existing activities are “similar” if they are comparable in nature, size, duration, and intensity. If proposing a deviation from the 500-foot (150-meter) buffer, applications should carefully document the existing activities on a site and whether project activities will increase beyond the existing levels.

### 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 for 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 non-native 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.
- 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 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.
- 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. Removal or modification of the structure is authorized without a permit, provided that:
  - An approved Wildlife/Habitat Management Plan (see definition in Florida's [Imperiled Species Management Plan](#)) is in place for the area in which the activity will occur, or
  - At least 14 days prior notification is provided to the [FWC's Species Conservation Biologist](#) for 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 1 to July 15) when the nest is inactive. Permittee wishing to remove a nest box installed as mitigation under a valid FWC permit must contact the FWC's Protected Species Permitting Office regarding a permit amendment to replace the mitigation.
- To encourage installation of kestrel nest boxes adjacent to private land, **take via significant habitat modification** is authorized within 0.31-mile (0.50-kilometer) radius of nest boxes that may have attracted kestrels, under these circumstances:
  - The entity that put up the nest box coordinated with FWC during placement or monitoring (e.g., coordinates and submits monitoring data)
    - These boxes are typically on public land and installed and monitored by partners (e.g., Park Service, Forest Service, Audubon).
    - FWC and partner nest box locations are recorded and available at [*website in development*].
  - The nest box is installed on a utility company rights-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.
  - These conditions do not apply to nest boxes installed for mitigation purposes. To distinguish excluded nest boxes put up for mitigation on utility rights-of-way, they will be recorded and available on the online mapping tool.

## 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 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, provide comments to Federal agencies (e.g., the Army Corps of Engineers) on federal actions, such as projects initiated by a Federal agency or permits being approved 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 under Rule 68A-27 F.A.C. may be accomplished through avoidance, minimization, and mitigation measures, provided sufficient, suitable nesting and foraging habitat occurs on the mitigation site for kestrels, 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, incidental take is take that is incidental to, and not the purpose of, carrying out an otherwise lawful activity. Activities that result in take of kestrels are prohibited without 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 [online permitting site](#), currently under the 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 will 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. The sections below describe 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 1 – July 15).
- If activities must be conducted during the breeding season within the 500-foot (150-meter) buffer 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 at Active Nest Cavities.

#### Design Modification

- Preserve natural cavities onsite where possible.
- Reduce the amount of foraging habitat converted to development or other incompatible land uses (i.e., land uses that do not provide the low, open habitat required by the species) within 0.31-mile (0.50 kilometer) radius of the Habitat Use Centroid.
- If it is not possible to reduce the amount of foraging habitat converted to incompatible land uses within 0.31-mile (0.50 kilometer) radius of the Habitat Use Centroid, preservation of sufficient foraging habitat outside of the radius is beneficial as it provides habitat for the displaced kestrels to use.
- Maintain (by use of mowing, prescribed grazing, or prescribed fire) remaining Suitable Foraging Habitat at less than 10 inches (25 centimeters) 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 500 feet of active nests.

### 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. All mitigation contributions support kestrel conservation actions consistent with the Species Action Plan for Southeastern American Kestrel (FWC 2013) or those identified by FWC subject matter experts as emerging needs for the species.

Table 1: Summary of Mitigation Options

Form of Take	Mitigation Options		
	Combination	Permit duration	Financial only (per nest cavity or kestrel pair)
<b>Disturbance of nesting pair</b>  (activities within 500-foot buffer of an active nest)	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 2. Habitat restoration, acquisition, or conservation easements 3. Combination of above with some financial mitigation	Varies	\$20,000

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

#### Mitigation for Disturbance at an Active Nest Cavity

Disturbance within 500 feet (150 meters) 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 feet 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.

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 suitable and sufficient 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 feet 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.

#### **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 feet 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 a simple report each year for the 5 years according to the template provided by the FWC's Protected Species Permitting Office.
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 suitable and sufficient foraging habitat to support breeding. (Adjacent properties count towards sufficient foraging habitat).

**Mitigation for Project Activities That Result in Significant Habitat Modification**

Mitigation for project activities that result in significant habitat modification will be evaluated on a case-by-case basis. An activity that results in reduction of Suitable Foraging Habitat to less than 124 acres (50 hectares) within a 0.31-mile (0.50-kilometer) radius circle around the Habitat Use Centroid ([Appendix A](#)) results in significant habitat modification by impairing the essential behavior of foraging, unless fewer than 124 acres (50 hectares) of Suitable Foraging Habitat is available within the radius prior to project activities. Note that both on-site and off-site habitat within the 0.31-mile (0.50-kilometer) radius is considered when evaluating availability of Suitable Foraging Habitat. Activities that can cause significant habitat modification include, but are not limited to, clearing, grading, paving, bulldozing, digging, building construction, and site preparation for development. Please note that permits will not be issued solely for proposed infrastructure (e.g., roads and utilities) that are part of a larger common development plan, project, plat, or subdivision. Issued permits must address all kestrels to be impacted on 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 with FWC approval of methodologies.

- A study assessing kestrel population size and movements on utility transmission corridors.
- A study of the effects of conversion of pastures to solar facilities on kestrel occupancy and demography.
- A study assessing the population status, demographics, and reproductive health of kestrels in human-modified landscapes (SAP Action 13).

**Habitat**

- Restoration of sandhill habitat on public or private conservation land large enough to support kestrels and within the kestrel's 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.
- Short-term or long-term commitment to use habitat management techniques that maintain Suitable Foraging Habitat in areas with sufficient foraging and nesting habitat to counterbalance take.
- Fee simple acquisition or conservation easements of potential habitat, with a commitment for long-term management and a habitat management plan, in areas within the kestrel's range with sufficient foraging and nesting habitat to counterbalance take.

**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 by employing Minimization Options or combining with other mitigation options.

**Information**

- Mitigation can be used to support research, monitoring, or educational projects included in or consistent with the objectives of 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.

**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.

## 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 apply for scientific collecting permits on the FWC's [online permitting site](#).

**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. *To avoid requests for additional information, please carefully review the Considerations for Issuing a Scientific Collecting Permit and Relevant to all Scientific Collecting for Southeastern American Kestrels sections below.*

Scientific collecting permit applications involving **captive possession** for any period of time must include a full explanation of whether the facility has the appropriate resources for accomplishing the objectives and for maintaining 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, and must include information about the ability of the applicant(s) to conduct

the educational activities, their history of performing such activities, and resources for maintaining kestrels. For kestrels, appropriate educational use means that the kestrel must be housed at a non-profit scientific or educational facility, must 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), and must not be displayed for commercial purposes (i.e., in any manner that implies personal use or that promotes or endorses any product, merchandise, good, service, business or organization). Additionally, applicants that wish to possess live kestrels for educational purposes must abide by caging requirements (Rule 68A-6, F.A.C.) and obtain a license for exhibition/public sale (372.921 F.S.).

For **possession of dead kestrels, or their parts or infertile eggs**, an applicant must meet the definition of appropriate educational use provided 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 contains the elements in the Considerations for Issuing a Scientific Collecting Permit section above.
- 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 the [online permitting site](#). The FWC also encourages applicants to include qualifications of sub-permittees in the Registered Agent permit. This approach will allow applicants to upload qualifications only once rather than repeatedly uploading them in each scientific collecting permit application.
- Any mortality should be reported to the FWC, and FWC staff will provide guidance on proper disposal of specimens in the permit conditions.
- 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/>

## Literature Cited

- Beatty, M., K. E. Miller, and R. Fletcher. 2020. Southeastern American Kestrel Data Gaps in Scrub and Sand Pine: Population Estimation, Habitat Relationships, and Management Guidelines. Final Report, Florida’s State Wildlife Grants Program. Florida Fish and Wildlife Conservation Commission, Tallahassee, Florida.
- Bohall-Wood, P., and M. W. Collopy. 1986. Abundance and Habitat Selection of Two American Kestrel Subspecies in North-Central Florida. *The Auk* 103:557–563.

- Brown, J. L., M. W. Collopy, and J. A. Smallwood. 2014. Habitat fragmentation reduces occupancy of nest boxes by an open-country raptor. *Bird Conservation International* 24:364–378.
- Carpenter, G. P. 1993. Effects of Food Availability and Disturbance on Nesting. Snake River Birds of Prey National Conservation Area Research and Monitoring Annual Report 295. US Department of the Interior, Bureau of Land Management, Boise District, Idaho.
- Davis, C., J. Heath, and C. McClure. 2017. Nest box use by American kestrels and other cavity-nesting birds during the nonbreeding season. *Avian Conservation and Ecology* 12(2):5.
- Dudley, J. M., M. Erkontalo, and G. Genty. 2015. Environment, Wildlife and LED Illumination. *Optics and Photonics News* 26:42–47.
- Fink, D., T. Auer, A. Johnston, M. Strimas-Mackey, O. Robinson, S. Ligocki, B. Petersen, C. Wood, I. Davies, B. Sullivan, M. Iliff, S. Kelling. 2020. eBird Status and Trends, Data Version: 2018; Released: 2020. Cornell Lab of Ornithology, Ithaca, New York.
- Florida Fish and Wildlife Conservation Commission. 2013. A species action plan for the southeastern American kestrel. Tallahassee, Florida.
- Gault, K. E., J. R. Walters, J. Tomcho, L. F. Phillips, and A. Butler. 2004. Nest success of southeastern American kestrels associated with red-cockaded woodpeckers in old-growth longleaf pine habitat in northwest Florida. *Southeastern Naturalist* 3:191–204.
- Hager, S. B. 2009. Human-Related Threats to Urban Raptors. *Journal of Raptor Research* 43:210–226.
- Kawula, R., and J. Redner. 2018. Florida land cover classification system. Florida Fish and Wildlife Conservation Commission, Tallahassee, Florida. <https://myfwc.com/media/20455/land-cover-classification-revision-2018.pdf> Accessed 21 July 2020.
- Kim, D. H., F. Chavez-Ramirez, and R. D. Slack. 2003. Effects of artificial perches and interspecific interactions on patch use by wintering raptors. *Canadian Journal of Zoology* 81:2038–2047.
- Maney, P. L., and J. W. Parrish. 2007. Southeastern American Kestrel (*Falco sparverius paulus*) nesting in tubular, cross-armed electrical transmission towers in south-central Georgia. *The Journal of Raptor Research* 41: 243-246
- McClure, C. J. W., S. E. Schulwitz, R. Van Buskirk, B. P. Pauli, and J. A. Heath. 2017. Commentary: Research recommendations for understanding the decline of American Kestrels (*Falco sparverius*) across much of North America. *The Journal of Raptor Research* 51:455–464.
- Miller, K. E. and A. Fasoli. 2014. Southeastern American Kestrel Population Monitoring and Recovery. Final Report. The Florida Fish and Wildlife Conservation Commission, Tallahassee, Florida.
- Miller, K. E., R. Butryn, E. Leone, and J. A. Martin. 2019. Habitat Preferences of Nesting Southeastern American Kestrels in Florida: The Importance of Ground Cover. *Southeastern Naturalist* 18:192.
- Miller, K. E., and J. A. Smallwood. 1997. Natal Dispersal and Philopatry of Southeastern American Kestrels in Florida. *Wilson Bulletin* 109:226-232.
- Rattner, B. A., S. F. Volker, J. S. Lankton, T. G. Bean, R. S. Lazarus, and K. E. Horak. 2020. Brodifacoum toxicity in American kestrels (*Falco sparverius*) with evidence of increased hazard on subsequent anticoagulant rodenticide exposure. *Environmental Toxicology and Chemistry* 39:468–481.
- Rohrbaugh, R. W., Jr., and R. H. Yahner. 1997. Effects of macrohabitat and microhabitat on nest-box use and nesting success of American kestrels. *The Wilson Bulletin* 109:410–423.
- Smallwood, J. A. 1987. Sexual Segregation by Habitat in American Kestrels Wintering in Southcentral Florida:

- Vegetative Structure and Responses to Differential Prey Availability. *The Condor* 89:842–849.
- Smallwood, J. A. 2016. Effects of Researcher-Induced Disturbance on American Kestrels Breeding in Nest Boxes in Northwestern New Jersey. *The Journal of Raptor Research* 50:54–59.
- Smallwood, J. A., M. F. Causey, D. H. Mossop, J. R. Klucsarits, B. Robertson, S. Robertson, J. Mason, M. J. Maurer, R. J. Melvin, R. D. Dawson, G. R. Bortolotti, J. W. Parrish, T. F. Breen, and K. Boyd. 2009a. Why are American Kestrel (*Falco sparverius*) Populations Declining in North America? Evidence from Nest-Box Programs. *The Journal of raptor research* 43:274–282.
- Smallwood, J. A., and M. W. Collopy. 2009. Southeastern American kestrels respond to an increase in the availability of nest cavities in North-Central Florida. *The Journal of Raptor Research* 43:291–300.
- Smallwood, J. A., P. Winkler, G. I. Fowles, and M. A. Craddock. 2009b. American Kestrel Breeding Habitat: The Importance of Patch Size. *The Journal of Raptor Research* 43:308–314.
- Smallwood, J. A. and D. M. Bird. 2020. American Kestrel (*Falco sparverius*), version 1.0. In *Birds of the World* (A. F. Poole and F. B. Gill, Editors). Cornell Lab of Ornithology, Ithaca, NY, USA.
- Smith, D. G., C. R. Wilson, and H. H. Frost. 1972. The Biology of the American Kestrel in Central Utah. *The Southwestern Naturalist* 17:73–83. Southwestern Association of Naturalists.
- Stupik, A. E., T. Sayers, M. Huang, T. A. G. Rittenhouse, and C. D. Rittenhouse. 2015. Survival and Movements of Post-Fledging American Kestrels Hatched from Nest Boxes. *Northeastern Naturalist* 22:20–31.
- Stys, B. 1993. Ecology and habitat protection needs of the southeastern American kestrel (*Falco sparverius paulus*) on large-scale development sites in Florida. Florida Game and Fresh Water Fish Commission, Nongame Wildlife Program Technical Report No. 13. Tallahassee.
- Tracey, K. F., and K. E. Miller. 2018. Monk Parakeets Provide Nesting Opportunities for the Threatened Southeastern American Kestrel. *Journal of Raptor Research* 52:389-392.
- Village, A. 1982. The Home Range and Density of Kestrels in Relation to Vole Abundance. *The Journal of Animal Ecology* 51:413–428.

## 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 mile (0.50 kilometer) 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-foot (0.25-kilometer) radius. Sightings where the 820-foot 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-mile radius around the habitat use centroid to determine the kestrel territory. Determine the total acreage of Suitable Foraging Habitat (see [definitions](#)) within 0.31-mile 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 500 feet of an Active Nest Cavity, or
  3. Reduction of Suitable Foraging Habitat to less than 124 acres within a 0.31-mile radius around the Habitat Use Centroid, given available Suitable Foraging Habitat prior to development is 124 acres 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-mile radius.

## Appendix B. Kestrel Nest Box Placement and Monitoring

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

**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 inches 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-inch doorsill to prevent chicks from falling out when the door is opened (optional but recommended if nest checks are done by opening the box).
- Kestrels do not bring nest material into the nest box, therefore providing woodchips (2-3 inches 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 will be crushed or addled during incubation. **Never install a kestrel nest box without woodchips.**
- 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 acres of Suitable Foraging Habitat within a 0.31-mile radius of the box.
- Mount nest box 10 to 15 feet 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-inch 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 feet (50 meters) and ideally 500 feet (150 meters) 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 feet [30.5 meters] 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 miles [0.80 kilometers] 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.

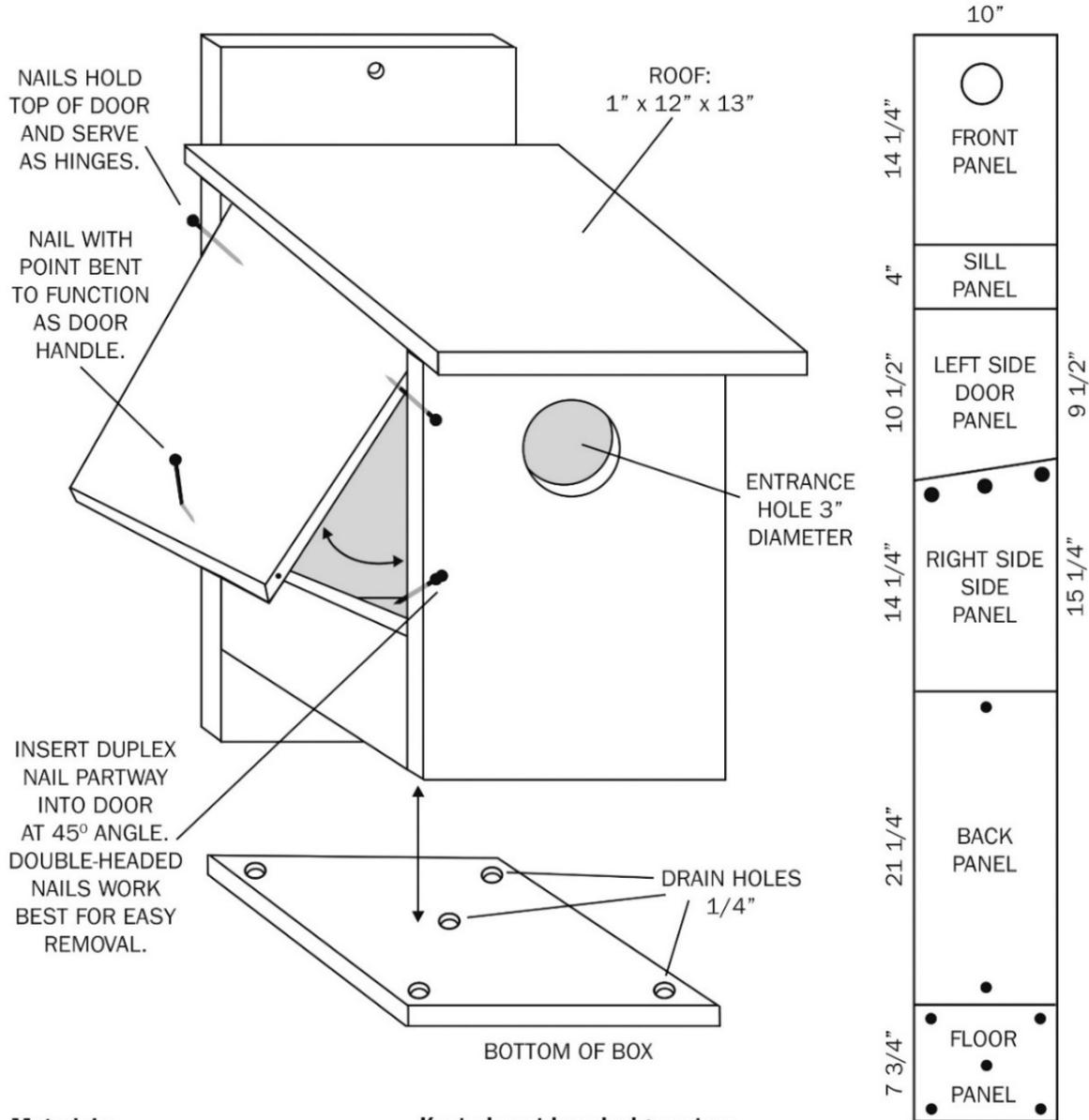
### **Monitoring Kestrel Nest boxes**

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**

# American Kestrel Nest Box



**Materials:**

- 1" x 10" x 6' board untreated rough-cut cedar, cypress or pine
- 1" x 12" x 13" of same kind of lumber
- Thirty-six galvanized #6d box nails
- One 2 1/2" duplex nail
- Three #8 x 1 3/4" wood screws to attach roof to back

**Kestrel nest box design notes:**

Use at least 3/4 to 1" inch thick wood for construction. Place nest box at least 10 feet from the ground on a pole, snag, or live tree. Nest box opening should face away from roads or hazards and the entrance should be unobstructed with a clear flight path. Line the bottom of nest box with 2-3" of wood shavings (not sawdust). (Modified from *Nongame Wildlife Technical Report No. 13*)

BOARD:  
1" x 10" x 6"

