

# Nestboxes for American Kestrels

The American Kestrel is a small, predatory bird about the size of a Blue Jay. Once known as the Sparrow Hawk, this tiny raptor is not a hawk at all, but a small falcon that is closely related to the Peregrine Falcon. Once plentiful across the Pennsylvania countryside, the American Kestrel is now declining in the northeastern United States.

Throughout much of the United States, Kestrels live in open habitat, such as meadows and farmlands, where they feed upon insects, lizards, mice and small birds. American Kestrels frequently hunt from roadside utility lines, as well as by hovering in stationary flight while flapping into the wind.

Many Kestrels migrate hundreds of miles between breeding sites in Pennsylvania and wintering grounds in the southern United States. Others stay in the same area year-round.

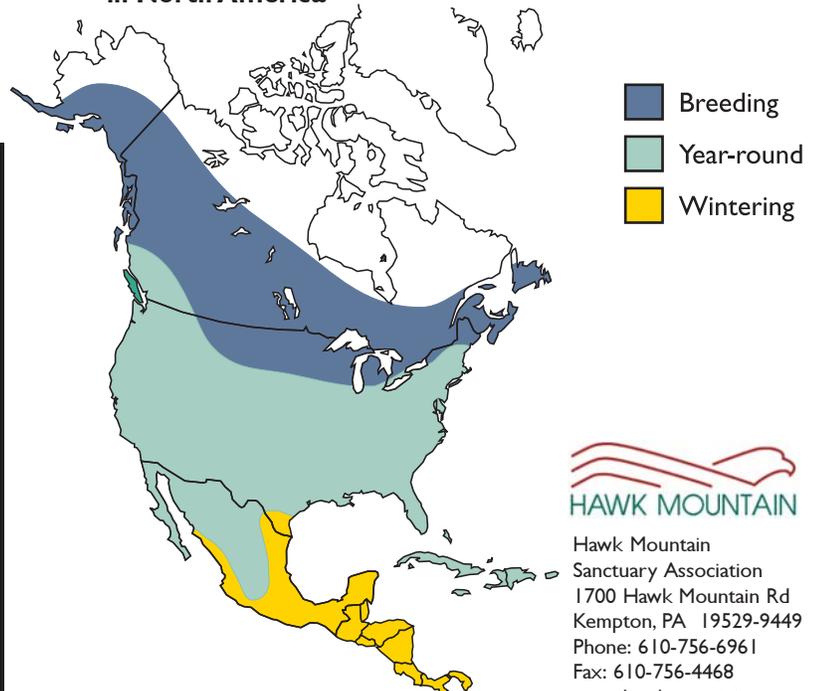
American Kestrels do not build nests, but use a cavity in a dead tree. The practice of removing dead trees limits nest sites for the bird. Placing nestboxes in open habitat or farmland is known to boost Kestrel numbers. By providing nestboxes, Pennsylvania landowners in rural and agricultural communities can play an important role in the future of this small falcon.



Male American Kestrel at a nestbox

R. & S. Day/VIREO

## Distribution of the American Kestrel in North America



## Kestrels benefit farms

Building a nestbox is easy.  
Kestrels reduce common pests.

The American Kestrel is a farmer's friend. This raptor dines on many farm pests, including many insects, mice and voles. In fact, they can effectively contribute to pest management, especially in fields. For example, some grape growers use Kestrels to control flocks of grape-eating starlings, finches and robins that move into vineyards as fruit ripens.

  
HAWK MOUNTAIN

Hawk Mountain  
Sanctuary Association  
1700 Hawk Mountain Rd  
Kempton, PA 19529-9449  
Phone: 610-756-6961  
Fax: 610-756-4468  
[www.hawkmountain.org](http://www.hawkmountain.org)

# Kestrel Biology



## Field Identification

Because they are so small—American Kestrels weigh about a quarter of a pound—and frequently perch on utility lines, Kestrels often are mistaken for Mourning Doves and other small birds. There are, however, several key field characteristics for



identifying Kestrels, including their distinctive plumage and flight silhouette.

In silhouette, perched Kestrels have roundish heads, short, hooked beaks, medium to longish tails, and wings that extend nearly to the tip of the tail. In flight, Kestrels have long, pointed, sickle-shaped wings and longish tails. Their rapid wingbeat is frequently interrupted by gliding. Kestrels often tip back and forth while perched.

At close range, and in good light, the Kestrels' colorful plumage can help identify them. Kestrels have grayish crowns with rufous crown patches, white cheeks, and two vertical black stripes or "side-burns." They have large, dark eyes with contrasting orange-yellow eye-rings, and two dark "eye spots" on the back of their heads.

You can distinguish between male and female Kestrels by their different plumages. Males have rufous backs—with or without black bars—and bluish wings. Females have rufous backs and wings with many black bars. Males have rufous tails with one thick black band near the tip. Females have rufous tails with many black bars. Males have

whitish to rufous underparts, often with black spots. Females have heavily streaked, creamy underparts. Although females are about 10% larger than males, this difference is not always obvious in the field.

## Range and Habitat

Kestrels occur throughout the state, except in the heavily forested Allegheny Plateau, where recent surveys indicate only scattered populations. They are most common in open country, including grasslands, farmlands and orchards. The number of Kestrels nesting in Pennsylvania is declining.

## Migration

Each autumn, thousands of Kestrels breeding in the northern part of their range migrate from a few hundred to more than a thousand miles south. Kestrels generally avoid spending the winter in snow-covered areas, where it is difficult for them to find small-mammal prey. Pennsylvania's Kestrels include summer residents (birds that nest in the state, but winter farther south), winter residents (birds that nest north of the state and overwinter here), and year-round residents.

Most Kestrels migrate past Hawk Mountain's lookouts in September and early October. Large numbers of Kestrels are seen migrating the day of, and the day after, a cold front. At such times, strong, northwest winds create updrafts along the mountain slopes. In much the same way as surfers ride waves crashing on the beach, Kestrels ride these updrafts to stay aloft and save energy while migrating south each autumn.

Females migrate earlier and winter farther south than males.

At least some of Pennsylvania's Kestrels migrate to Florida each winter. A female Kestrel banded as a nestling in a nestbox near Allentown, Pennsylvania, was captured by Hawk Mountain banders in January 1996 near Fort Myers, Florida. The

same bird was recaptured at a nestbox north of Allentown later that year.

## Diet

American Kestrels are versatile, opportunistic hunters. They feed on assorted invertebrate and small vertebrate prey, including large insects, lizards, mice and voles. Kestrels also feed on snakes, amphibians and small birds. Kestrels rarely take prey in excess of two ounces (about 60 grams), and they almost never feed on carrion. Insects appear to be the preferred prey, especially for recently fledged Kestrels.

In temperate habitats, Kestrels switch from feeding on insects to feeding on small mammals as temperatures drop in autumn and insects become less active. During periods of heavy snow cover, many Kestrels switch to feeding on small birds, or migrate further south.

## Feeding Behavior

Most Kestrels hunt from elevated perches, typically trees, buildings, and utility lines and poles. Kestrels also hunt by stationary, hovering flight, especially in moderate winds. Kestrels take more small-mammal prey when hover-hunting than when perch hunting.



B.K. Wheeler/VIREO

Kestrels sometimes capture prey disturbed by grazing livestock and tractors. They prefer to hunt in short grass.

Many Kestrels maintain exclusive hunting territories in winter. Female Kestrels, which are larger than males, successfully occupy the best hunting sites at such times.

## Nesting

Most Kestrels mate when they are one year old. Although Kestrels are monogamous, they usually do not pair for life. Males and females court and pair each spring. Male Kestrels choose territories and attract partners with aerial flight displays, and by offering prey to potential mates.

Kestrels nest in cavities and on protected ledges. Nesting sites include natural holes in



B.K. Wheeler/VIREO

trees, old woodpecker cavities, partially enclosed ledges beneath the rooflines of buildings and enclosed lofts, as well as nestboxes.

Once the pair bond is established and the birds mate, the female lays four or five cream-colored to reddish-brown, usually speckled eggs. Kestrel eggs are more spherical than chicken eggs and are slightly smaller than ping-pong balls (1.4 x 1.1 inches). Eggs are laid at one- to two-day intervals. Kestrel eggs hatch after 28 to 31 days of incubation. Females do most of the incubating. Males bring the food to them. Because females begin incubating before all of their eggs are laid, Kestrel chicks usually hatch over a period of several days.

Once hatched, nestlings are brooded (kept warm) by the adult female. Males provide most of the food during the nestling period, which lasts about four weeks. During the first two weeks out of the nest, recently fledged young spend most of their time perched within 50 yards of the nest cavity, usually within several feet of their siblings, waiting for their parents to feed them. Within several days of fledging, Kestrels “play hunt.” Less than a month after fledging, young Kestrels leave their nesting area to begin life on their own.

# Placing a Nestbox



Wooden nestboxes that resemble large bluebird boxes provide excellent nesting opportunities for American Kestrels. A nestbox is easy to build, erect and maintain.

## Selecting an ideal location

Because Kestrels hunt in open habitats, place nestboxes in areas surrounded by a minimum of one acre of open space with short vegetation. Although Kestrels are somewhat tolerant of human activity, boxes should not be placed in especially active areas. Good sites include:

- Large, isolated trees in the middle or along the perimeter of a field
- Barns or outbuildings with a large, open view for hunting
- Tall poles, including utility poles, surrounded by open habitat
- Orchards surrounded by open fields
- Open areas where small mammals are common and natural cavities are few

If you are not the landowner, be sure to obtain the owner's permission before erecting a nestbox. Use extra caution when working from a ladder, particularly near roads and utility lines.

## Tips for success:

- Place the nestbox 15 to 20 feet from the ground—high enough to deter casual visitors, but within reach of an extension ladder.
- The front of the box should be clearly visible from a distance.
- Ensure the box is surrounded by minimum of one acre of open space.
- Orient the box so that it faces away from a roadside.
- American Kestrels prefer barn-mounted nestboxes.
- Place boxes at least half a mile apart.
- Place nestboxes at least 50 yards from wooded areas.
- Erect boxes in late February, well before Kestrels establish nesting territories in mid-March.

## Watching the birds

Watching a family of Kestrels use your nestbox can be a satisfying pastime each spring, particularly as young Kestrels fledge. Remember to watch your box from a

## Kestrel Measurements

Males	Females
Length from head to tip of tail	
8-10 inches	9-11 inches
Weight	
3.4 - 4.5 oz	3.6 - 5.3 oz
Wingspread	
20-22 inches	21-24 inches

*From Clark and Wheeler, 1987*

## Visiting and maintaining your kestrel nest

Except for a maintenance visit each year, visiting the nestbox is optional.

*Your first visit* is to erect the box. Each year thereafter, you should visit the box for general maintenance. Visit the box in early- to mid-March, before the birds have established their territories. At this time, place two inches of coarse wood shavings—not sawdust—in the box to help cradle the eggs. Wear rubber gloves and a dust mask. Clear any old nesting materials, as well as any squirrel or mouse nests from the previous winter, and make any needed repairs.

*A second (or third) visit* occurs 7 to 10 days after the male brings the first egg. Usually in early March, the female should lay 4 to 5 eggs. **Visiting the nestbox** is to check on the birds to see if they are sitting on the eggs, but do not touch them—the Kestrels' eggs are protected by law. If fewer than 4 eggs are present, the birds are probably not sitting. 10 days later the female has completed



distance and to follow the guidelines below so that your box is not deserted.

Watch quietly from a distance of at least 50 to 75 yards to determine if Kestrels are using the nestbox. The best time to watch for activity is from mid-morning to late afternoon. If Kestrels are using the box, you should see evidence of nesting activity within one week of their arrival.

If your box does not attract a pair of Kestrels, do not be discouraged. It may take time—possibly several years—for the birds to discover the box.

### Dealing with other nesters

Other species of birds sometimes nest in boxes erected for Kestrels. This is especially true of the European Starling, an introduced species that is considered a pest on many farms. To discourage Starlings, orient the box so it has a southern exposure. If starlings enter the box, inspect it immediately and remove any nesting

materials they may have brought to it. It may take several visits to the box to discourage these interlopers.

If Starlings have already begun to lay eggs, remove the nesting material and destroy its pale blue eggs, which are smaller than Kestrel eggs. Be careful, however, not to destroy the eggs of native Eastern Screech-Owls and Eastern Bluebirds, both of which sometimes nest in Kestrel boxes and are protected by law. Screech Owl eggs are pure white and nearly spherical. Bluebird eggs are similar to Starling eggs, but smaller. See page 6 for photos of eggs.

Kestrels sometimes evict Starlings from the box. When this occurs, Kestrels will lay their eggs directly on top of the Starling's nest. Do not disturb such nests. Kestrels are capable of successfully raising their young in this situation.

Finally, squirrels can easily out-compete Kestrels for nestboxes. To discourage squirrels, erect nestboxes at least 50 yards from wooded areas.

### Nestbox

**Optional visit** should occur 7 to 10 days after you have seen activity at the nestbox. By June 15, the female should have laid all of her eggs. **Do not inspect the nest any earlier than June 15. Inspecting the nest cycle may cause the nest to be deserted.** Count the number of eggs. Do not remove or handle the eggs. Kestrels, including their eggs, are protected by state and federal law. If more than five eggs are present, the nestbox can be revisited 7 to 10 days later to make certain that the female has completed her clutch.

**A third (optional) visit:** The best time to visit the nest again is when the nestlings are 16 to 20 days old. You can determine this by adding 45 to 50 days to the date you believe the female completed her clutch. This allows for 30 days of incubation, plus 15 to 20 days of brooding.

**It is critical that you do not disturb the nestbox when the young are older than 24 days.**

At this time, the young will be large enough to jump out of the box when it is opened, but not strong enough to fly. A long fall may result in injury or death.

**A final (optional) visit** is for winter maintenance and should occur one month after the young have fledged. At this time, remove old nesting material. Doing this in late summer reduces the likelihood that other animals will use the nestbox in the winter. Kestrels may use the box as a roosting site in the winter, but most will migrate.

**Follow these guidelines to reduce the chance of disturbance or nest desertion.**

# Learn to identify other nesters

You can learn to identify other nesters by comparing the photos seen here with the eggs you find in your nestbox. Individual eggs are shown actual size, but the group photo at right is reduced to a show size comparison.

**REMINDER: Do not destroy the eggs of native Eastern Screech Owls or Eastern Bluebirds, both of which are protected by federal law.**



**Eastern Screech-Owl:** Clutch of 3 to 7, generally 4 to 5 elliptical eggs. Finely granulated shell with a moderate gloss. Pure white color.



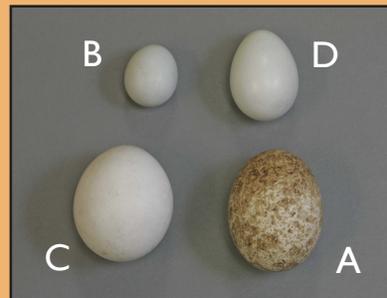
**American Kestrel:** Clutch of 3 to 5, sometimes 3 to 7 nearly spherical eggs. Smooth, non-glossy shell. White, creamy or pale pink color with cinnamon speckling that is often dense at one end.



**European Starling:** Clutch of 4 to 5, often 6 eggs. Shape varies from short-oval to long oval. Smooth shell with a slight gloss. Unmarked, pale blue or greenish white color.



**Eastern Bluebird:** Clutch of 3 to 6, generally 4 to 5 short elliptical eggs with a smooth, glossy shell. Pale blue, bluish white, occasionally pure white color.



Although Bluebird (B) and Starling (D) eggs may be similar in color, note the distinct difference in size and shape.

## References

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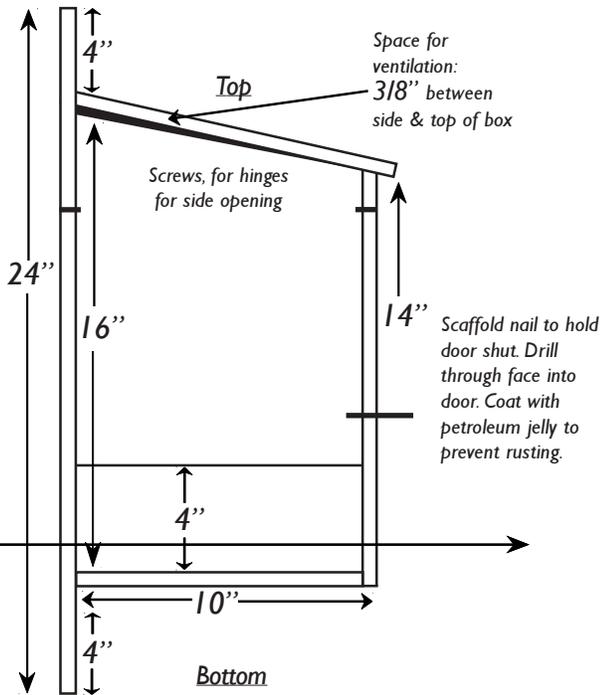
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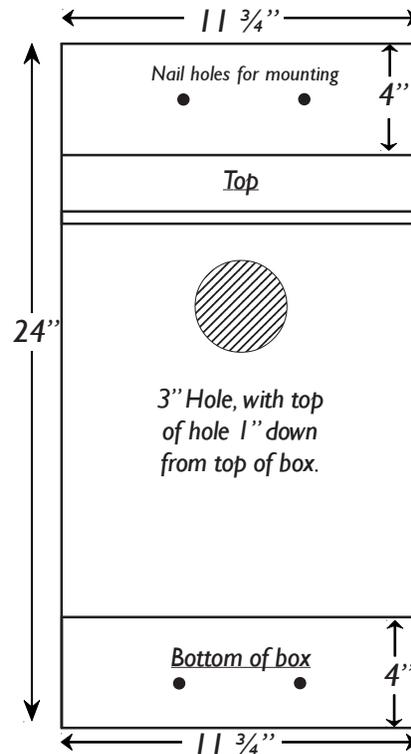
# Kestrel Nestbox Plans:

- Use raw pine or cedar. Do not paint or treat with a wood preservative.
- An outside perch is not necessary, and may attract other species to the box.
- Use 1 5/8" galvanized deck screws for the box.
- You can place a perch inside (using cutout from entrance) about three inches below the entrance hole.
- Place 2" of coarse wood shavings (not sawdust) in bottom of box each year before the nesting season.
- Place 2 two-penny nails top and bottom to attach to the tree.

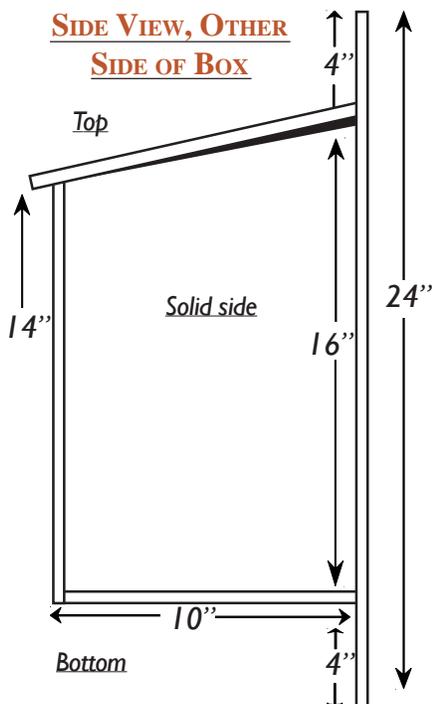
**SIDE VIEW WITH DOOR**



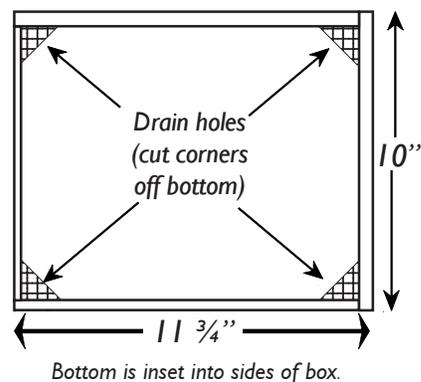
**FRONT VIEW OF BOX**



**SIDE VIEW, OTHER SIDE OF BOX**



**BOTTOM OF THE BOX**



# Nestboxes for American Kestrels

## A Guide for Pennsylvania Landowners

With an increasing number of Pennsylvania's wildlife living on privately-owned property, landowners have become important conservation partners. The American Kestrel depends on owners of farms, fields and meadows for food, water and shelter.

Erecting nestboxes for Kestrels is one way to help conservation while receiving other benefits. That is why Hawk Mountain Sanctuary is asking you and other landowners, farmers, and FFA and 4-H groups to invite American Kestrels to your farm or field by building and erecting a nestbox. A series of boxes can reduce insect and other pest populations, and benefit field crops.

Additional copies of this brochure and more information about Kestrels are available at [www.hawkmountain.org](http://www.hawkmountain.org). Mail your feedback and questions to [info@hawkmountain.org](mailto:info@hawkmountain.org).



Wendy V. Scott

## Partnering with Pennsylvania Landowners



Hawk Mountain Sanctuary and the Wild Resource Conservation Program are proud to partner with Pennsylvania's most important conservation resource: private landowners. For more information about American Kestrels, call or email us at [info@hawkmountain.org](mailto:info@hawkmountain.org).



**Hawk Mountain Sanctuary** is the world's first refuge for birds of prey and a 2,600-acre nature

reserve in the central Appalachian Mountains of eastern Pennsylvania. Located 85 miles northwest of Philadelphia, the Mountain is part of the Kittatinny Ridge, an internationally significant migration corridor for hawks, eagles and falcons, a designated Important Bird Area and a National Natural

Landmark. Each autumn, tens of thousands of raptors, including Ospreys, Bald Eagles, Golden Eagles and Peregrine Falcons, migrate past the Sanctuary.

The Sanctuary was founded in 1934 by Rosalie Edge, who created the refuge to stop the slaughter of migrating raptors at the site. Since then, the Sanctuary's science-based conservation efforts have focused on raptor protection, local land management, and public education.

The Sanctuary is a private, non-governmental organization supported by an international membership of more than 9,500 individuals. Hawk Mountain's visitor center is open daily from 9 am to 5 pm. Updates on the daily hawkcount, local weather and significant events are available by calling 610-756-6000 and online at [www.hawkmountain.org](http://www.hawkmountain.org). Email feedback to [info@hawkmountain.org](mailto:info@hawkmountain.org).



**The Wild Resource Conservation Program** was founded in 1982 to help conserve Pennsylvania's unique and critical wildlife, plants and

other sensitive species. In addition to a seven-member board and a 10-member advisory committee, Pennsylvania's Fish and Boat Commission, Game Commission, and Department of

Conservation and Natural Resources help the Program direct its resources.

The Wild Resource Conservation Program directs resources toward endangered and threatened species—both plants and animals—and educates both children and adults on how to help recognize and preserve some of Pennsylvania's most sensitive flora and fauna. The Program awards resource conservation grants every year to projects that protect or study plants, birds, mammals, fish,

reptiles, amphibians and other species. The Program is partially supported by Pennsylvania's "Growing Greener" program and also relies on people like you, either through tax-refund donations, the purchase of the otter license plate, or direct donations.

