

Maine American Kestrel Nest Box Monitoring Program

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A Project of the
Maine Natural History Observatory

Introduction

Thank you for your interest in Maine's American Kestrel Nest Box Monitoring Program. This is a project coordinated by Maine Natural History Observatory in partnership with the Maine Bird Atlas, a project of the Maine Department of Inland Fisheries and Wildlife. Your efforts to place nest boxes in appropriate breeding habitat and monitor their use will help us to understand the breeding distribution of kestrels in the state and increase the number of nesting options for a species which is experiencing declines throughout its breeding range.

Nest boxes should only be installed if the volunteer intends to monitor and maintain the box throughout the season. An unattended box can be detrimental to kestrels and other native nest box users if non-native species begin using the box. Paper wasps, mice, squirrels, and even snakes may take up residence in an unattended nest box. For more information on how to handle these situations, see the "*Maintaining Nest Boxes*" section below.

Why Monitor American Kestrels?

Hole nesting species have been able to find and use natural cavities in trees and other crevices naturally found in the wild, so why does Maine need nest boxes for these species? Birds have been getting help from humans for some time – think about all of the bird feeders that are put out in Maine each year. In addition, some bird species are losing nesting habitat. Natural nesting cavities can be found in areas with lots of standing deadwood, but sometimes this standing deadwood is removed for various reasons or there are no natural cavities suitable for nesting present in an area. Building nest boxes and placing them out in your gardens or other areas can make a difference for species where adequate nesting locations are limited. In addition, there is great

value in monitoring how well birds do at raising a brood of chicks, since that influences the number of individuals entering the breeding population in the future.

American Kestrels are currently experiencing widespread declines. Declining kestrel numbers in Maine have been attributed to a potential increase in competition for suitable nesting sites, loss of grassland habitat, pesticide use, and predation. This led Maine to list the American Kestrel as a "Species of Greatest Conservation Need" in the 2015 Maine Wildlife Action Plan.

Identifying the issues leading to declines in American Kestrels will require a better understanding of the species' distribution during the breeding season and monitoring their breeding success at nesting sites. Like many other cavity nesting bird species, American Kestrels will readily nest in properly designed boxes placed in suitable habitat. This quality makes kestrels far easier to observe and monitor during the breeding season. Observing kestrels at nest boxes can provide vital information about the species breeding behaviors and the success of their breeding efforts here in Maine.

Natural History

The American Kestrel, once known as the Sparrow Hawk, is the smallest falcon in North America. This small raptor sports colorful plumage, bold facial markings, and, with its long and pointed wings, is a swift predator. It is mostly associated with open habitats such as grasslands, meadows, powerline right-of-ways, and agricultural landscapes, but will also take up residence in more developed areas if suitable nesting and hunting sites are present.

American Kestrels hunt in open areas with low-growing vegetation and are often observed perched on a treetop, utility wire, or building from which they scan their surroundings for prey. In the absence of a perch, kestrels will hover in place by rapidly beating their wings. From their vantage points, kestrels pounce on prey including small

mammals such as mice, voles, and shrews, insects such as grasshoppers, cicadas, beetles, dragonflies, and sometimes small songbirds.

American Kestrels are a cavity nesting species. They do not, however, excavate or modify nesting cavities like woodpeckers, chickadees, or nuthatches. They instead usually rely upon the abandoned nest sites of woodpeckers. They prefer nest sites ranging from 10' to 30' in height that are in or on the border of open areas. Males are responsible for finding these nest sites and must attract a female kestrel with their plumage, dive displays, and quality of their selected nest site.

Copulation is a commonly observed breeding behavior between mated kestrels and can be initiated by either pair member. The transfer of food items (from males to females) is part of pair bonding and is a probable indicator that kestrels breed within the area. Pairs tend to remain bonded throughout life and will nest together year after year. Kestrels will breed with new partners, however, if one of the pair is killed or disappears.

American Kestrels in Maine

Although American Kestrels live throughout much of North America year-round, this falcon species does not overwinter in Maine. In the breeding season, however, they are widely distributed throughout the state and can be found from the Kennebunk Plains of York County all the way up to agricultural lands of northeastern Aroostook County.

Nest Box Monitoring

For this project, we are asking volunteers to install nest boxes in American Kestrel habitat and to monitor these boxes throughout the breeding season. The breeding season is a sensitive time for nesting birds. Because of this, our efforts are designed to

minimize disruption that could lead to stress on these birds. The safety of the volunteers, the nesting adults, and their young is a priority. It is important to adhere to the monitoring protocol described below to best guarantee a successful season for all parties. Lastly, it is important to remember that if your nest box remains unoccupied, this is still important information. If no birds take up residence in a nest box this season, that is okay. We still would like for you to collect data that can be used to inform our effort. Give the birds some time to find your box, but if your box remains unused after many years, it is worth moving the box to a new location.

Where to Install Nest Boxes

Kestrel nest boxes should be installed in open areas such as grasslands, meadows, agricultural areas, pastures, old fields, parks, shrublands, and residential areas with adequate open foraging space (minimum of acre). Sites with adjacent perches such as snags, isolated trees, posts, utility poles, and other scattered vantage points are especially suitable. Boxes should be placed, when possible, at least 50 feet from wooded areas. Sites with extensive tree cover, limited open space for foraging, and near loud roadways should not be used.

Nest boxes should be installed between 8' and 30' in height (10-12' is our preferred height) on the side of a building, although placement on a post or a tree in a field could also suffice. This means you will more than likely need to use a ladder to access the box during monitoring and maintenance. Take extra care with ladders, follow all safety precautions, and make sure to have a second person present to help steady the ladder. Placement and monitoring of nest boxes are potentially hazardous, and extreme care to your safety is the highest priority. Be familiar with the safe working practice for any tools you use. Beware of electricity from overhead power lines, particularly if carrying or placing a ladder, and keep nest boxes at least 50 feet away

from any power lines. Ensure your ladder is secure before you climb. Please do not risk injury of any kind - the nest box and breeding observations are not worth the risk of an accident.

The box should be installed with its opening facing roughly southeast, making sure there is some shade on the box during the hottest part of the day so that the chicks won't overheat with full sun on the nest box. While some cover (such as tree branches) is acceptable, the box should not be obscured, should be easily viewable from 30' away, and birds should have a clear flight path to the box. While volunteers are welcome to install and monitor more than one nest box, each kestrel box should be installed a minimum of 0.5 miles apart.

Predators should be considered when picking a location for the nest box. It may be impossible to avoid all potential predators, but pay particular attention if the area has outdoor cats and pick a location for the box where cats cannot climb and access the nest box. If predators are a big problem in your area, consider adding a predator guard to keep them from reaching the box (<http://nestboxbuilder.com/nestbox-predator-controls.html>).

There are many methods for attaching nest boxes to trees or buildings, and you will need to use the method that best suits your particular needs. You can drill holes into a short piece of wood (wider than the nest box) and tie this tightly to the tree using wire (pad the wire to help protect the tree), then attach the nest box to that short piece of wood.

Monitoring Protocol

Here in Maine, the American Kestrel breeding season runs from approximately 25 May until 25 July. These safe dates indicate the time period where most migrating birds have already reached their breeding grounds. As such, these dates will serve as the start and end date for conducting nest box monitoring. Nest boxes (with coarse wood

shavings – not sawdust – in the bottom of the box) should be installed by 1 May, if possible, to best ensure that the box is considered by arriving males.

It is important to remember that nest boxes are not always used immediately after they are put up (actually we expect less than 50% of boxes will be used in the first year), and we hope that this does not discourage you. Perseverance is essential as it takes time for birds to find a nest box and learn that it can be safe for nesting. If your nest box does not attract a nesting kestrel, it is not a wasted effort. Other species may still use the box for nesting or roosting.

25 May to 22 June: Monitoring should be conducted once per week. During these first four weeks of monitoring ending on 22 June, observations should be limited to viewing the nest box from a distance of approximately 30' to avoid disrupting the kestrels during the early nesting phase. The time and duration of your visit is up to you and your availability. We ask that you spend *at least* 15 minutes conducting observations per visit during this period. All observations should be entered onto your monitoring data sheet. Note that opening the nest box early in the nest cycle may cause the birds to desert the box, so this is strongly discouraged.

During the first few weeks of nest box monitoring, your efforts will be entirely focused on observing American Kestrel breeding behaviors at the nest box. You may observe behaviors which indicated that breeding is possible or probable. In some instances, you may be able to confirm breeding even during these early weeks. Make note of breeding behaviors you observe during your monitoring visit on your data sheet. A possible indicator that American Kestrels breed in the area would be the presence of an adult in appropriate habitat (code **H**). There are several probable indicators of breeding that may be observed. Agitated adults may give “klee” calls from a nearby perch if they feel intruders are too close to their nest (code **A**). An adult visiting a probable nest site would be coded as **N**. Often this probable nest site will be the nest box, but it is possible that a pair will take up residence in a natural site like a

woodpecker or other cavity. Aerial courtship displays, copulation (often on a tree branch near a nest site), and food transfers are coded as **C**. American Kestrels defend their nesting territories and give chase to larger raptors such as Red-tailed Hawks and Cooper's Hawks. Fighting and aggressive displaying (spreading the wings and tail feathers) may occur between male kestrels early in the breeding season. Both these types of territorial defense should be coded as **T**. The presence of a pair moving together and interacting in the area should be coded as **P**. Confirming kestrel breeding will likely occur during the latter portion of the season, however, you may observe kestrels carrying food items to the nest box (code **CF**) or dismembering larger food items to feed to begging young at the nest box (code **FY**) before your nest box visits if the pair begins nesting early.

23 June to 25 July: During this latter part of the survey period (once you have seen the male bring food to the nest box), volunteers are asked to limit their observations to once every two weeks. During this part of the project, view the inside of the nest box to note the number of eggs and/or nestlings. If you suspect that the young are older than 24 days or getting close to fledging, do not check the nest as the young birds are liable to fledge prematurely if disturbed. This will likely require the use of a ladder to access the box, although some has successfully used a small video camera taped to an extension pole to observe the contents of the nest box. When using a ladder, securely mount the ladder on the side of the box with the hinged side (through which you will access the nest box). Carefully and quietly ascend the ladder to the nest box. Once at the nest box, volunteers will gently tap the tree trunk or outside of the box (to encourage any adults to leave the box), open the box, count the number of adults, eggs, and/or nestlings without touching or disturbing any adults or young, and close and secure the nest box. If any young fledge prematurely with the disturbance, gather them up and put them back in the nest box. You may need to put your hand over the hole for

a few minutes while the young settle before you can quietly move away. Take care to avoid inhaling any dust from old nests and always wash your hands after working at a nest.

While conducting visits to the nest box, it is important to work quickly and quietly. The amount of time spent at the open nest box should be limited to the time it takes to make your counts and no longer. In most instances this should be no longer than 10 to 15 seconds. Do not touch the birds or reach into the box for any reason. This work should be conducted as quietly possible. The data sheets should not be completed at nest box, but should be promptly completed once you are at least 30' away from the box. If the adults appear stressed by your presence, move back another 30'.

During the latter portion of the season, your observations will be largely focused on your nest box visits. You are encouraged to note any other observed breeding behaviors you see during this period on the comment section of your data sheet. Count the number of adults present when making your visit then count the number of eggs and/or nestlings visible during your nest box check. American Kestrels typically lay between 3 to 5 eggs. Eggs are not glossy and are typically light reddish, with darker speckling that is often dense at one end. Very young nestlings have only a scant coat of white down, but will develop a second, thicker coat of cream-colored down as they age. Again, **there is no reason to reach into the box or touch any of the birds.** Simply note what you are able to see from your vantage point outside the box.

Reporting your results

Send your completed datasheets to Maine Natural History Observatory at the end of the field season (contact info on the datasheet). In addition, it is very helpful if you can enter these breeding records directly into the Maine Bird Atlas eBird portal (<https://ebird.org/atlasme/home>).

Maintaining Nest Boxes

Proper maintenance of a nest boxes is just as important as nest box placement. Nest boxes should be cleaned annually and, when necessary, repaired between seasons. At the end of the season (once all the young have fledged and the nest box is unoccupied), take down the kestrel box. Leaving the box up between seasons will shorten the life of the box and could mean squirrels, wasps, mice, or other species could nest in the box. Take down the box, empty it of any nest materials (wear gloves), and store the nest box in a dry, protected place until the next field season. Do not use any cleaning solutions when cleaning out the box. If there is a build-up of debris stuck inside the box, use warm water and stiff-bristled brush to clean out the box (dry in the sun before storing). If any major repairs are needed, consult the nest box design instructions to complete the repairs yourself so long as you are comfortable doing so. Fresh coarse wood shavings (2-3 inches deep) should be used to line the inside of the box. Sawdust should not be used as it will clog the drainage holes, hold moisture when wet, and could possibly cause drowning of the chicks.

A note on competition with non-native bird species. Introduced Old World species such as European Starlings and House Sparrows often compete with native species for nest boxes. The larger diameter openings required for American Kestrel nest boxes make simply excluding these species impossible. These introduced species threaten native wildlife and are therefore not protected by state or federal laws. If Kestrels have already started using the box, they are usually successful in defending their box against these species. If Kestrels have not found the nest box, there are two options if invasive bird species take up residence in the nest box. Option 1: Nest box removal. Once an invasive species moves into the box, it is unlikely that kestrels will use the box that same field season. Therefore, volunteers who are comfortable doing so are welcome to remove nest boxes for the season and dispose of any materials, nests, and eggs associated with an invasive species discovered in an American Kestrel nest boxes.

These contents should be disposed of well away from the nest box. Option 2: Continue your observations. While preventing invasive species from nesting is the ideal solution, some volunteers may not feel comfortable disposing of invasive species nesting materials and eggs. That is okay. If that is the case, you are encouraged to continue your observations. If you observed European Starlings or House Sparrows entering the box, inspect the box as soon as possible to confirm the invasion and either remove the box for the season or continue making observations of the invasive species. If one of these non-native or any other native species takes up residence in your nest box(es), note the species in the comment section on your form. If a *native* bird species takes up residence in the box, simply make note on your data sheet and continue your observations. Native bird species should not be disrupted regardless of if they are the project's target species.

A note on competition with other wildlife: Occasionally, you may discover that other forms of wildlife have taken up residence in your nest box. These may include mice, squirrels, insects, and snakes. These animals can be removed from the nest box if you are comfortable doing so. Should you decide to remove these animals, proper precautions should be exercised during this type of maintenance. If rodent nests are found within the box, remove the contents with gloved hands. Small paper wasp nests can be manually removed from boxes and destroyed with a gloved hand. Do **not** use any insecticides to exterminate insects as these products may contain chemicals which can be hazardous to nesting birds using the box. If a particularly large nest of stinging insects is suspected or detected, make note. Large stinging insect nests will likely have to be removed at the end of the season. Unless discovered and removed quickly at the beginning of the season, the presence of any of the animals discussed above will likely mean kestrels do not use the nest box this field season. Any box which is invaded by

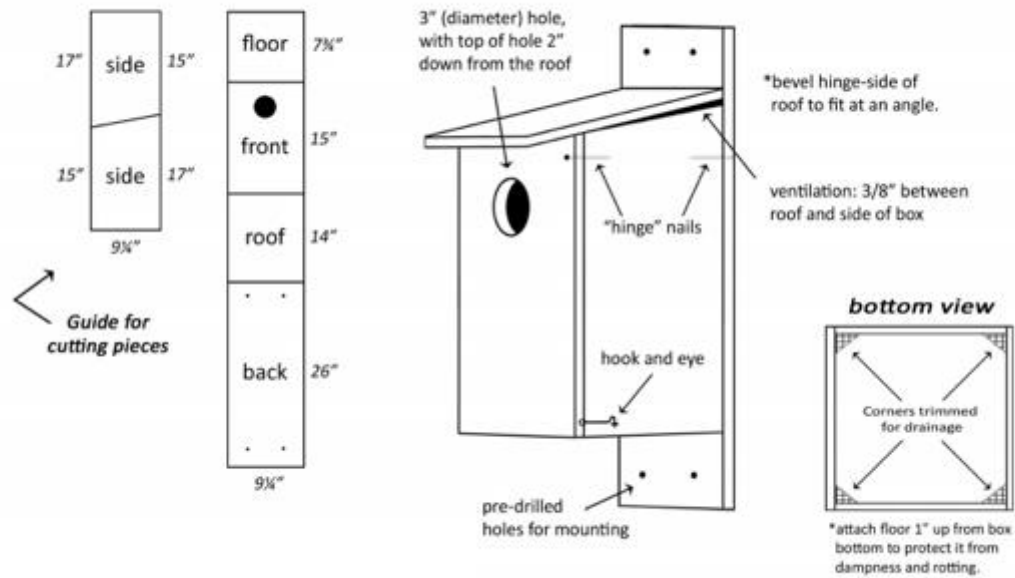
these non-bird animals should be relocated to a new location the following field season. Do **not** risk injury for the sake of nest box maintenance.

Nest Box Plans

A good nest box design must be secure from predators, weatherproof, simple and inexpensive to construct, monitor, and maintain, and the target species must accept and use the box to successfully fledge healthy young. A limited number of Kestrel nest boxes are available free to volunteers. If we have run out of our supply of nest boxes, you can get on a waiting list when additional nest boxes are available, or you can build your own using the plans below. See the "Contact" section should you have any questions about the nest box plans. These nest plans were generously shared by The Peregrine Fund. Note that the dimensions given in these plans do not need to be measured to the nearest fraction of an inch - natural nest holes where kestrels nest are variable in size and their openings also differ in size and shape. There is room for experimentation in nest box design, defense against predators, and location. Using wood from scrap piles or even driftwood will help to keep costs down. **Do not paint or treat the wood for a nest box with any preservatives.** Do not add a perch to the box as they are not needed by kestrels and would provide a foothold for predators. It is often helpful to use a marker to number your nest boxes so that it is easier to keep track of multiple nest boxes.



Build an American Kestrel Nest Box



Materials:

- (1) 8' 1"x10", White Pine or Cedar
- Coarse wood shavings (to line the bottom of the nest box)
- (20-30) 1 1/2" Exterior Screws (trimhead)
- (2) 8 Penny Common Nails, galvanized (for hinge)
- (4) 3" wood screws or galvanized lag screws and washers (for mounting)
- (1) 2" hook and eye (for locking the nest box)
- Cordless Drill
- Staple Gun and staples

- Table Saw
- Skill Saw or Chop Saw
- Jig Saw or 3" hole saw
- Hammer
- Caulking Gun and Acrylic Latex Caulk (optional)

Instructions:

1. Begin by gathering all necessary tools and nest box components. Your materials should consist of a Front, Fixed Side, Opening Side, Bottom, Back, Roof, and a latch (to secure the opening side).
2. Preassemble the nest box to ensure the fit of each part - make adjustments as necessary.
3. With the box still preassembled, attach the Front of the box to the Fixed Side and the Bottom with 1 ½" exterior screws. **Special note:** The Bottom should be installed approximately 1/2"-1" from the bottom edge of the front and sides of the box. This will help prevent rain from running into the box during storm events.
4. Place the box with the Front facing down and fasten the Back of the box to the Fixed Side and Bottom with 1 ½" exterior screws. Install roughly 4"-5" from the top/bottom of the Back (thus leaving room to mount the box to a tree, building, or post in the spring).
5. Turn the box over with the Back facing down. Fasten the Roof to the Front, Back, and Fixed Side of the box using 1 ½" exterior screws. **Do not** attach the Roof to the Opening Side.
6. Now to install the opening side. Ensure that there is large enough gap at the top of the Opening Side so that you can open the box once the hinge nails are installed. Hammer a galvanized nail through the Front of the box through the top of the Opening Side. Turn the box over and nail through the Back of the box into the Opening Side exactly opposite the first nail. These nails will function as a hinge.
7. Install the hook and eye latch on the bottom of the Opening Side. This will keep the Opening Side of the box securely fastened.
8. Place the box with the Front facing up. Using a 3" hole saw, cut an opening through the front of the box. Clean out debris from inside the box.
9. Line the inside of the back with 2"-3" of course wood shavings (not sawdust).
10. The nest box is ready to deploy!

Helpful tips:

- Predrilling all your holes will help prevent splitting when fastening the box together.
- **Do not** use wood glue on your nest box. Doing so will make replacing a damaged component on the box far more difficult. Instead, use a thin bead of acrylic latex caulk along the seams of the box (barring the Opening Side). As the nest box continues to dry and shrink, you can add additional caulk to seal any cracks that form.
- You can add a piece of hardware cloth or a small block on the inside of the box below the opening to make it easier for nestlings to access the opening.

Contact

For questions regarding this project, please contact:
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Email scans of completed data sheets to:
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or mail to:
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