The Cornell Lab
NestWatch

Nest Monitoring Manual

The Cornell Lab of Ornithology
NestWatch

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birds.cornell.edu

Acknowledgments

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The Cornell Lab of Ornithology is a nonprofit membership institution whose mission is to interpret and conserve the earth's biological diversity through research, education, and citizen science focused on birds.

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Some material in the NestWatch Nest Monitoring Manual has been adapted from the Ontario Nest Record Scheme Handbook and the British Trust for Ornithology Nest Record Scheme Handbook.

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Introduction

NestWatch is a nationwide monitoring program designed to track status and trends in the reproductive biology of birds, including when nesting occurs, number of eggs laid, how many eggs hatch, and how many hatchlings survive. Our database is intended to be used to study the current condition of breeding bird populations and how they may be changing over time as a result of climate change, habitat degradation and loss, expansion of urban areas, and the introduction of non-native plants and animals.

NestWatch teaches people about bird breeding biology and engages them in collecting and submitting nest records. "Citizen scientists" submit their nest records to our online database where their observations are compiled with those of other participants in a nationwide effort to better understand and manage the impacts of environmental change on bird populations.

For decades, citizen scientists enjoyed monitoring and recording nests via the Cornell Lab of Ornithology's Nest Record Card Program. Now, these nest data can be submitted on NestWatch.org, adding to our ever-growing database in real-time. This long-term data set becomes more valuable each year and is vital to scientists studying and predicting the effects of climate and land-use changes on birds. Because these impacts may vary with latitude, weather conditions, and habitat, it is important to study them on a national or even global scale.

Aimee Benoit

American Robin fledgling.

Participating in NestWatch is easy and just about anyone can do it, although children should always be accompanied by an adult when observing bird nests. Simply follow the directions on our website to become a certified NestWatcher, find a bird nest using our helpful tips, visit the nest every 3-4 days and record what you see, and then report this information on our website or via our mobile app. Your observations will be added to those of thousands of other NestWatchers in a continually growing database used by researchers to understand and study birds. Simply put, your participation takes this effort far beyond what teams of professional researchers can achieve on their own. And while you are contributing extremely valuable information to science, you will learn firsthand about birds and create a lifelong bond with the natural world.

How to Participate in NestWatch

1 Create a NestWatch Account

Go to NestWatch.org and create an account. If you already have an account for eBird, Project FeederWatch, YardMap or any other Lab of Ornithology project, please use your existing account.

Optional: Download the NestWatch Mobile app.

2 Get Certified to Monitor Nests

Review the NestWatch Code of Conduct (see page 7) to learn how to monitor nests without causing harm to birds. After registering for an account you will see a notice on your data homepage to take the nest monitor's certification quiz, which is based on the NestWatch Code of Conduct.

3 Look For an Active Nest

Prior to searching for a nest, we recommend familiarizing yourself with the nesting cycle of birds (see page 32). You can also learn about our common nesting species online. These species are featured because you are very likely to encounter them in your backyards and neighborhoods. Other helpful information is found here:

- Tips for Finding Nests (see page 6)
- You also can find additional Nest Monitoring "How Tos" online on NestWatch.org.

For more information and resources, visit NestWatch.org

4 Monitor Nests and Collect Data

This is the really fun part! Once you are a certified nest monitor and have found an active nest (a nest under construction or containing at least one egg or nestling), you can begin collecting breeding data. Each time you visit a nest, write down your observations on a NestWatch data sheet (see sample on page 12) and use a new data sheet for each new nest. Alternatively, skip the paper and enter your data directly on our mobile app.

Your nest visit schedule should closely follow the NestWatch Protocol for monitoring nests (see page 8).

5 Enter Your Data

Log in to your account and begin by registering the locations of your nest sites and completing their descriptions. Next, you can enter your breeding data for each nest. You can enter your data as you go or wait until the end of the nesting period. If you use the mobile app, data is entered into our database automatically.

Note: It is important to include data on failed nest attempts as well as successful ones.

6 See Your Data

As one of thousands of citizen scientists across North America, you are now a member of our research team. Take a look at the data you entered on a map and compare them with other participants' data. You can also download your data for your own records. View project-wide data summaries, including our annual NestWatch Digest report on the Explore Data tab: nestwatch.org/explore-data.

Nest Monitor's Code of Conduct

Observations of nests should never jeopardize the well-being of birds. Please exercise extreme caution and responsibility when monitoring nests to ensure the safety of birds, nests, and nest contents. The NestWatch Code of Conduct will help you minimize the three potential risks that all nest monitors must be careful to avoid:

- Accidental harm to a nest
- Parental desertion of a nest
- Attracting predators to a nest

1. Learn about the nesting cycle of birds

Birds are diverse and fascinating creatures! Make the most of your NestWatch experience by understanding a bit about their nesting behaviors. Appendix D provides a brief and general overview about avian nesting cycles. More information about breeding birds can be found at our website.

2. Plan and prepare for nest visits

Make a plan to conduct observations of nests every 3-4 days following the NestWatch protocol. Most successful songbird nests last about 30 days, so you may need to visit each nest 8-10 times. The first time you encounter an active nest, accurately record its location in your field notes and draw a picture of its location to avoid long searches on subsequent visits. Prepare materials, such as data sheets, notebooks, GPS units, etc., before your nest visits to minimize time spent in the immediate vicinity of the nest. Nest visits should last no longer than one minute. Clipboards are an excellent way to keep your data sheets organized.

3. Choose appropriate times to visit nests

Generally, you should AVOID visiting nests under the following conditions:

- **Do not check in the early morning.** Most birds lay their eggs in the morning, so plan on visiting nests in the afternoon. Also, most adults will temporarily leave the nest when you are near, and eggs and young nestlings can become cold quickly if left alone in the morning.
- **Avoid nests during the first few days of incubation.** If possible, observe nests from a distance and approach only when the female leaves the nest.
- **Do not approach nests when young are close to fledging.** When the young are disturbed during this stage, they may leave the nest prematurely. Young that fledge prematurely usually do not stay in the nest despite attempts to return them, and their survival rates outside the nest are low. When young birds are fully feathered and very alert, only observe the nest from a distance.
- **Avoid nests during bad weather.** If it is cold, damp, or rainy, postpone checking nests until another day. Checking nests during this time can be very stressful for birds.
- **Do not check nests at or after dusk,** when females may be returning to the nest for the night. The exception to this would be owls, which typically leave the nest at dusk.

4. Search carefully

It is critically important that monitors avoid damaging nest sites. Nests that have yet to be discovered are particularly vulnerable. When searching for nests, move slowly through dense foliage, being careful not to dislodge any nests. The nests of ground-nesting

Quick Guide to Code of Conduct

- Learn about the nesting cycle of birds
- Plan and prepare for nest visits
- Choose appropriate times to visit nests
- Search carefully
- Approach nests with care
- Minimize disturbance at the nest
- Do not handle birds or eggs*
- Don't leave a dead-end trail
- Respect private land
- Understand the Migratory Bird Treaty Act

**It is illegal under the Migratory Bird Treaty Act to take, possess, import, export, transport, sell, purchase, barter, or offer for sale, any native bird, or the parts, nests, or eggs of such a bird except under the terms of a valid permit issued by federal and, in some cases, state agencies.*

birds, such as Killdeer, Ovenbirds, Bobolinks, and many waterbirds, are difficult to see, so tread lightly and be cautious around potential ground nest sites.

5. Approach nests with care

Avoid leaving tracks that can direct predators to nests. Nest predators are everywhere—on the ground, in vegetation, and in the air—and many are smart enough to watch you! Be careful that predators such as cats, crows, and jays are not following you. Minimize damaging or trampling vegetation that could expose nests.

6. Minimize disturbance at the nest

It is important not to startle a bird as you approach the nest; this may cause it to accidentally knock out eggs or young when it flies off. Before approaching the nest, try to see if a parent is sitting on it. Whenever possible, wait a few minutes to see if the bird leaves on its own. If it does, this is the ideal time to check the nest. If the bird is to be flushed, give it ample time to slip off quietly by rustling branches or making noise during your approach. Nest boxes should be tapped first, then tapped again when open to allow the parent to slip away before you stare directly into the box. If a sitting bird does not leave on its own, do not force it off the nest. Remember to keep each visit brief, and wait until you are well away from the nest before recording your field notes.

Premature Fledging

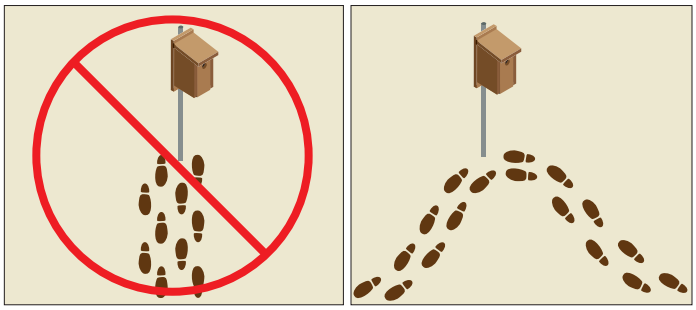
Before they are fully feathered and ready to fledge, the young of many species instinctively scatter from the nest when a potential predator approaches. If this happens during a nest check, gather the birds quickly and replace them gently but firmly in the nest cup, the smallest on top, and covered with a hand or tissue. Withdraw the cover smoothly after giving time for the nestlings to settle. This is most successful if you can keep yourself out of sight. If they leave the nest again, it's best to let them be and allow the parents to round up the young themselves. The adult birds will continue to care for young that fledge prematurely. Note that if you approach a nest and find that it has already fledged, you should not attempt to put fledglings back in the nest. Fledglings may appear helpless, but those fully feathered and capable of hopping or gliding short distances should be left alone. The parents are likely watching nearby.

7. Do not handle birds or eggs

Do not handle young birds or eggs. Eggs can be easily cracked or small nestlings injured. Small nestlings are remarkably helpless and may not be able to crawl back into the nest cup if displaced, even inside of a nest box. Children monitoring nests should always be under the supervision of an adult. If you wish to band birds or handle nest contents, you need to possess the proper federal and/or state or provincial permits.

8. Don't leave a dead-end trail

Whenever possible, take a different route away from the nest site than the route you took to reach it. Walking to the nest and back along the same path leaves a dead-end trail that can lead predators directly to the nest.



To avoid leaving a dead-end trail that may lead predators directly to a nest, approach a nest by one path and leave it by another.

9. Respect private land

If you wish to search privately owned land for nests, first gain permission from the landowner. Explain your purpose; many landowners will probably be interested in learning more about what you are doing and what birds are nesting on their property. Treat landowners and their property with respect, and follow any special requests that they make.

10. Understand the Migratory Bird Treaty Act

Under the Migratory Bird Treaty Act, it is illegal to take, possess, import, export, transport, sell, purchase, barter, or offer for sale, any migratory bird, or the parts, nests, or eggs of such a bird except under the terms of a valid permit issued by federal and, in some cases, state agencies. Additionally, many species are protected by other state and local laws. Therefore, in most instances, it is illegal for you to touch or otherwise physically disturb an active nest or its contents. This includes moving a nest from one location to another, even just a short distance away.

Nest-Monitoring Risks

Abandonment

If you find a nest with eggs and no parents, verify whether the nest is indeed abandoned. Prior to incubation, birds may leave their eggs unattended for most of the day. During incubation, adults may leave the nest for periods of up to 30 minutes to feed. Although many songbirds begin incubating on the day the last egg is laid or the day before, there are exceptions.

Joe J.

A House Wren nest and eggs.

For example, Tree Swallows may wait up to a week to start incubating a clutch of eggs. A nest such as this may only appear to be abandoned.

Threats of predation, harsh weather, or infestations of insects can cause the parents to leave. Frequent or aggressive disturbances from humans also can cause nest desertion, and care should be taken to eliminate this possibility. Certain species are more prone to deserting nests than others. Also, young breeders are typically more sensitive than experienced pairs, though individual birds vary greatly in the degree to which they will tolerate nest inspection.

Please remember:

- Do not assume a nest is abandoned just because you don't see or hear an adult bird in the vicinity, even for long periods of time.
- It is illegal to handle or remove materials, inlcuding eggs and nestlings, from an active nest without appropriate permits.
- Do not try to hand-raise eggs or young that appear abandoned. Raising wild birds is very difficult and illegal without appropriate permits.
- Contact a local wildlife rehabilitator if you find injured birds or believe they need intervention.

One-Month Rule

The eggs of most birds will remain viable for up to two weeks after being laid even before they are incubated, so as a general rule, you should wait at least one month after the expected hatch date before concluding that a nest is abandoned.

Predation

Nest predation by crows, jays, chipmunks, weasels, squirrels, skunks, raccoons, snakes, small rodents, cats, or birds of prey is a common cause of nest failure. Observers often fear that increased predation may result from the observer leaving a track or scent-trail to nests. However, a two-year investigation by the British Trust for Ornithology showed that nests visited frequently had similar success rates as nests left undisturbed between laying and fledging. Predation in the absence of human involvement has also been demonstrated by searches of completely undisturbed areas late in the season. Such findings are consistent with the normal high annual mortality of songbirds. However, you should still do your best to minimize unwanted attention to the nest.

If you are monitoring nest boxes in predator-prone areas, we recommend outfitting them with predator guards. Common predators of nest boxes include raccoons, snakes, cats, and squirrels. Please see page 16 for more information on dealing with predators.

Bill Apgar

Wood Duck eggs in a nest box are vulnerable to any predator that can get through the entrance hole.

Tips for Finding and Monitoring Nests

Patience and good observation skills will go a long way toward finding nests. Once you find one, minimize disturbance to the nest site and surrounding area.

Before searching for nests

- Please read and understand the Code of Conduct for Nest Monitoring (page 3).
- Read the NestWatch Protocol for Monitoring Nests (page 8), which specifies when to collect information needed to determine daily nest survival.
- Get certified to monitor nests.
- Print out the Nest Check data sheet from our website to determine what to record in the field, or download the NestWatch mobile app.
- Recognize behavioral cues of breeding birds (see this page).

When to look for nests

Generally in North America, birds nest between March and August. In warmer climates, the nesting season may begin as early as February; in cooler climates, nesting may not begin until late May or June. Because most songbirds feed their young insects, nesting is closely tied to insect abundance. Resident birds, or those that do not migrate in the winter, usually begin nesting earlier than non-resident or migratory birds, which may have traveled great distances to reach their breeding grounds.

If possible, during fall and winter, look for old nests in trees that have yet to regain their leaves. Many birds will come back to the same nest site year after year.

Eastern Bluebird Fledgling by Linda Hall

Charles Hubber

American Robin chicks beg for food.

Where to look

You can find nests in nearly all habitats across the continent. However, NestWatch has created a list of common species that were chosen for their tendency to nest in areas where people also live. The Common Species Guide (see page 3) includes birds such as American Robin, Eastern Phoebe, Mourning Dove, Tree Swallow, and Eastern, Western, and Mountain bluebirds. For those species that don't nest in cavities or nest boxes, look for clumps of nest material in shrubs, trees, and on the ground, being careful to gently part vegetation and not to dislodge nesting material.

Behavioral cues to look for

Observing birds at the nest is one of birdwatching's highest rewards, but there is a skill to finding these camouflaged gems. Sometimes the easiest way to find a nest is to tune in to the sights and sounds of your backyard, and be on the alert for particular behaviors:

- **Pay attention to "extra" bird noise** - if you're busy outside and something sounds different, pay attention to it. It could be the nasal whining sounds of nestlings clamoring to be fed, or it could be the irritated scolding of a female warning that you're too close to her nest.

- **Follow the gaze** -If you're watching a bird that has been repeatedly checking out your weedy hedgerow, or that lush willow, it's probable that the bird knows you're there watching it. She won't go directly to the nest, but she may perch above it or beside it, casting glances down or over at it. If the gaze is directed at a consistent spot, regardless of where the bird is perched, that's a good area to check out later, when she's not around.
- **Watch for destruction** - Birds don't generally break off branches, vigorously tear up mouthfuls of grass, pluck out their own feathers, or peel the cotton off of your patio furniture for no good reason. This is a clue that they're gathering nest materials, so if you see this behavior, keep your eyes on that bird. Watch where they go once they've stuffed their beak.
- **Flying with purpose** - Just as a bird may fly directly to a feeder, they also make direct flights to and from the nest. This is particularly true during nest-building and once the eggs have hatched. If you see a direct, fast flight, especially if there is anything in the bill or feet, then be alert: that bird is on a mission.

After you locate a nest

- **Note its location** - The first time you find a nest, note its location carefully so that you can easily find it again later. If you find a nest in a spot that may be difficult to relocate, look around and try to memorize some visual landmarks. We do NOT recommend placing any type of flagging within 20 meters of a nest. Instead, draw a picture in a field notebook, recording compass bearings and distances from landmarks. Record additional information about nest contents on the field data sheet. To keep each visit brief, prepare equipment beforehand (e.g., data sheets, notebook, camera, and GPS unit). A sturdy stick is worth carrying, and is useful for parting foliage to view a nest; leaning on to inspect a nest without disturbing the immediate surroundings; and rustling foliage to warn a nesting bird of your approach, enabling it to leave the nest.

Curve-billed Thrasher eggs by Luanne Hirsch

Using a mirror to see a nest that is more than 5 feet off of the ground.

Carol Jean Lovette-Young

Pileated Woodpecker nestlings vocalizing from their nest cavity.

- **Use mirrors or binoculars to monitor nests from a distance** - If the nest is too high, you might have to use a mirror to see into it. Attach a small mirror (e.g., a bicycle or mechanic's mirror) to the end of a pole and position the contents in the reflection. If a nest is so out of reach that you can't monitor it safely, you can still collect valuable information by observing activity through binoculars. You may not be able to get an exact count of eggs or young, but you can determine if the nest is active and whether the parents have eggs or nestlings by observing their behavior.
- **Be efficient and thorough** - Check the nest quickly. On average, nest visits should take less than one minute. Count the eggs/nestlings and then leave the immediate area to record your data. Remember, if you miss a day or can't get an exact count, it's okay. Safety of the birds should be your first priority!

NestWatch Protocol for Monitoring Nests

There is always some risk of disturbing birds when monitoring their nests. By following the NestWatch protocol, which is based on the nationally recognized Breeding Biology Research and Monitoring Database (BBIRD) Field Protocol, and input from professional biologists, you will minimize this risk and ensure that your data achieves a high quality standard and will be comparable with data collected by other NestWatchers. The protocol described below is intended to gather the most meaningful data without causing unnecessary disturbance to the birds. Although it may be tempting to visit nests more often than suggested, please try to keep disturbances at the nesting area to a minimum.

1. Find a nest. Putting up a nest box is an easy way to start, but please consider monitoring open cup nests as well. You can find more information on how to locate nests on the NestWatch Common Nesting Birds pages (nestwatch.org/learn/focal-species).

2. Remember where the nest is located. It may be helpful to write a short description or draw a picture of the nest site in a field notebook. Do not use flagging unless absolutely necessary because this can attract predators. If you must use flagging to relocate a nest, use a small strip, place it at least 30 feet away, and take accurate notes on how to locate the nest from the flag.

3. Create a new NestWatch nest site by going to the "Your Data" section of the NestWatch website and clicking the "Add New Nest Site" button, or if the nest site has already been recorded during a previous nesting attempt, make sure that its description is up-to-date. If you're using our mobile app, simply tap "Add New Nest Site" from the homepage. You can also view nest sites on the app that you created on our website.

Robert Strickland

Eastern Screech-Owl chick, still in down feathers, peeks out of its nest box.

Get Certified to Monitor Nests

Please take our online certification quiz (nestwatch.org/nw/certification) to learn how to monitor nests safely. We recommend that you review the quiz every three years to stay up-to-date on the protocol.

4. Check the nest every three to four days. Record the number of eggs and young observed during each visit, as well as other relevant observations such as the behavior of adult birds. Longer intervals between checks make it harder to determine the outcome of the nest, while shorter intervals increase risk of disturbance. Whenever possible, wait for the female to leave the nest on her own rather than scaring her off. Use a mirror attached to the end of a pole to see into nests that are higher than your head.

5. Visit the nest one last time after you are certain that it is empty to determine if any unhatched eggs or dead young remain.

6. Record your observations. You can record data on the mobile app during each visit, or on NestWatch.org after each nest visit. Go to "Your Data" and click on the "Add/Edit Attempt" icon for that nest. If you prefer to enter your data at the end of the nesting attempt, please carefully record your observations in a notebook after each visit. Each nesting attempt should be recorded separately, even if a bird has a second nest in the same location (nest site) as a previous attempt. Nest sites may be re-used for multiple nesting attempts over the season and over many years, when applicable.

7. Enter nest summary information at NestWatch.org by going to "Your Data", clicking on the "Add/Edit Attempt" icon for that nest, and clicking the "Summarise this nesting attempt" button. On the mobile app, it will ask whether you want to summarize the attempt after each nest visit. Tap "Finalize nesting attempt" after your final nest visit.

Estimating first egg, hatch, and fledge dates

We define these dates as:

First Egg Date—Estimated date that first egg was laid for each nesting attempt.

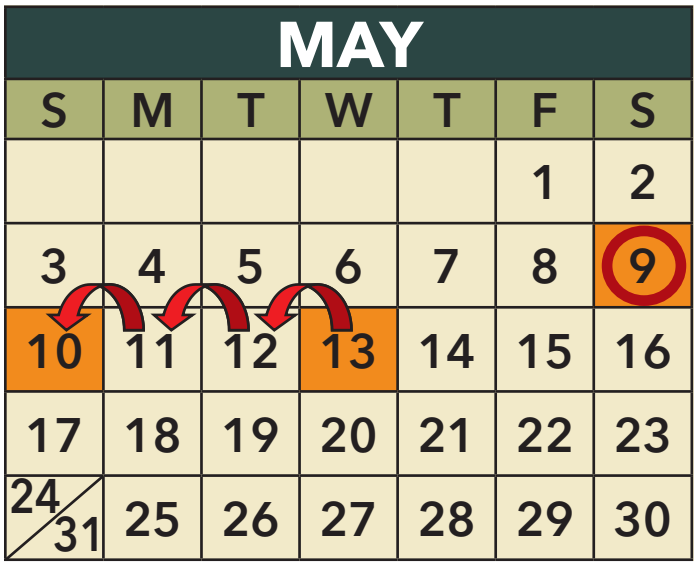
Hatch Date—Estimated date that first egg hatched for each nesting attempt.

Fledge Date—Estimated date that the first nestling left the nest, for each nesting attempt.

Lindsey Sanders

A Piping Plover hatches.

We ask participants to provide estimates on first egg, hatch, and fledge dates for their nests. For most songbirds, you can calculate a first egg date by backdating using the assumption that one egg is laid per day. For example, suppose you encountered 2 eggs in the nest on May 10 and you visit the same nest again on May 13 and discover 4 eggs. Counting backward one egg per day, we know the first egg was laid on May 9, the second egg was laid on May 10, the third on May 11, and the fourth and last egg on May 12 (see diagram below).



If you monitor nests more then once during egg-laying, you can determine first egg dates for songbirds by counting backward one egg laid per day.

Richard Winegar

Purple Martins on hatch day.

Once the clutch is complete, the female will usually start incubating after the last or second to last egg is laid. Most songbirds will typically incubate eggs for 11 to 14 days, but see our Common Nesting Birds pages for species-specific incubation periods (nestwatch.org/learn/focal-species). The eggs of most songbirds usually hatch within 24–48 hours of each other, and songbird nestlings spend approximately two to three weeks in the nest before fledging.

Once you've entered a few nest visit observations and identified the species being monitored, we will provide the average incubation and nesting periods for the most commonly observed bird species on the Nest Attempt data entry web page. You can use these ranges to help you anticipate important events, or determine when a nest should fledge or if it has failed.

Craig Moody

An Eastern Bluebird incubates her eggs.

Data Quality and the NestWatch Protocol

We are often asked why we use such a rigorous protocol for collecting data when it would be easier to simply report the final numbers of eggs, nestlings, and fledglings for each nest. While it is possible to just report the final tallies of eggs, nestlings, and fledglings for each nesting attempt, this does not allow for the most insightful analyses of your data. When participants use the "Multiple Visits" method of data entry (i.e., reporting their nest checks every 3 to 4 days as outlined above), scientists can estimate a very important demographic rate called **daily nest survival**, which is defined as the likelihood that any nest in a population will survive from one day to the next.

Accurately estimating **nesting success** (the fraction of nests in a population of birds that fledge at least one young) is a critical goal of most nest monitoring programs. Nests that are destroyed by predators or weather early in the nesting cycle have a very low likelihood of ever being found, whereas nests that survive until fledging are much more likely to be noticed and monitored because they are around longer and because nests become more conspicuous as the parents begin feeding and defending their brood. For these reasons, nests that survive the longest are most likely to be found and nests that fail are often missed by nest monitors entirely. Since this **detection bias** means that you are likely to find more successful nests than unsuccessful ones, it is important to correct for the fact that your data will tend to overestimate actual nesting success.

Kim Caruso

Tree Swallow nestlings begging for food.

To eliminate this bias, our nest monitoring protocol is designed to collect nesting data that can be used in statistical methods that utilize daily nest survival statistics, such as the **Mayfield Method** (Mayfield 1961, 1975) and the **Logistic-Exposure Method** (Shaffer 2004). In order for researchers to use these statistical methods to estimate nest survival, it is critical to collect a chronological record of observations from each nest visit. This will also enable researchers to conduct more sophisticated analyses, such as examining how factors such as habitat, seasonal effects, or daily changes in climatic variables affect the probability of nesting success.

Laura Szmania

A House Wren brings food to its nestlings.

Glenda Simmons

Eastern Bluebird adult and fledglings.

Collecting NestWatch Data in the Field

Collecting data using the nest check data sheet or the mobile app involves reporting exactly what you see each time you monitor a nest. If you check a nest five times in one season, then you report five visits for that nest. Your nest check data provide a chronological record of observations, making it possible to calculate estimates of daily nest survival. These estimates can help identify critical time periods of high or low nest survival.

We need to know the location of the nest, the species, and the contents of the nest when you visit. The more details you can provide, the better we can understand the threats facing breeding birds.

Don't forget! You can download the NestWatch mobile app to easily enter data from the field. Available for iOS and Android devices.

Email us if...

- you find a rare bird nesting.
- you find a nest and can't identify the species. Before contacting us, try our guide to Common Nesting Birds to determine the host species (**nestwatch.org/learn/focal-species**). If you still can't identify the species, email the NestWatch staff with the following information: the precise location, habitat, description of the nest, and nest contents.Please include a photo attachment, if possible and/or a description of the adult if you see one visit the nest. You may want to hold a quarter next to the nest for scale.

NestWatch@cornell.edu

NestWatch

Checking Eastern Bluebird nests.

Paper Data Collection Guidelines

- Record location, habitat, and nest observations on the nest check data sheet.
- If you need more space on the data sheet to record nest visits, begin another data sheet and include the nest site name.
- If the same species uses exactly the same location more than once in the same season, use a separate data sheet, but specify that the location is identical to a previous nesting attempt.
- Report all active nests (i.e., with at least one egg or those actively under construction) that you visit, even if they fail to fledge young. We need your help in learning about why nesting attempts fail just as much as why they are successful.
- If eggs or young are present, but you can't get an exact count, record "U" to indicate at least one egg or young is present, but exact number is unknown.
- If you can't tell if there are eggs or young present, you should not submit any data for that visit.
- For meaningful reporting, a minimum of three visits is encouraged.
- Record each visit online either as the season progresses or at the end of the season.

The Cornell Lab of Ornithology
NestWatch

Nest check data sheet

Use this form to describe your nest site and to record data from each visit. Use a separate form for each nest monitored and each new nesting attempt. See back for explanations of codes and fields. When finished, please enter completed forms online at: **www.nestwatch.org.**

Year 2019 **Species** Tree Swallow

1. NEST SITE LOCATION

Nest site name
Box 1A

Address: Nearest street address ***OR***
123 Hickory Street
Ithaca, NY 14850

Latitude (decimal degrees; ex 47.67932)
N

Longitude (decimal degrees; ex -76.45448)
W

2. DESCRIPTION (see key on back)

Nest is located (circle one) (IN) ON UNDER
Nesting substrate Nest box
Cavity orientation (circle one) N, S, E, W, (NE), SE, NW, SW
Cavity opening width 1.5 ☑ in. or ❑ cm
Predator guard ❑ None or ☑ Type: Cone
Habitat within 1 arm length Human modified
Human modified description Yard
Habitat within 1 football field length Human modified
Human modified description Residential area
Height above ground 4.8 ☑ ft. or ❑ m

3. BREEDING DATA If eggs or young are present but not countable, enter "u" for unknown.

	DATE	HOST SPECIES			STATUS & ACTIVITY CODES				COWBIRD ACTIVITY			MORE INFO	
	Month / Day (1-12) /(1-31)	Eggs	Live Young	Dead Young	Nest Status	Adult Status	Young Status	Mgmt. Activity	Eggs	Live Young	Dead Young	Obs. Initials	Notes (or mark X for notes below)
Ex.	4/23	1	0	0	cn	aa	no	no	0	0	0	BB	x
1	5 / 8	2	0	0	cn	va	—	no	0	0	0	MS	
2	5 / 12	5	0	0	cn	aa	—	no	0	0	0	MS	
3	5 / 17	5	0	0	cn	va	—	no	0	0	0	MS	
4	5 / 22	u	u	0	cn	ra	—	no	0	0	0	MS	x
5	5 / 26	1	4	0	cn	va	hy	no	0	0	0	MS	
6	6 / 1	1	4	0	cn	va	py	no	0	0	0	MS	
7	6 / 6	u	u	0	cn	fa	fy	no	0	0	0	MS	x
8	6 / 8	1	0	0	cn	va	no	no	0	0	0	MS	
9	6 / 20	1	0	0	cn	no	no	em	0	0	0	MS	
10	/												

4. NESTING ATTEMPT SUMMARY Fill in information for HOST SPECIES TOTALS below after the nesting attempt is complete.

IMPORTANT DATES

First Egg Date	5/7/19
Hatch Date	unknown
Fledge Date	unknown

HOST SPECIES TOTALS

Visits to nest	Clutch Size	Unhatched Eggs	Live Young	Fledglings
9	5	1	4	4

NEST FATE: At least one young fledged from the nest.

NOTES:
May 22 - I could not see because the female remained on the nest during my nest check.
JUNE 6 - Checked box from a distance, but could tell young still in the nest.

Please enter data online at www.NestWatch.org

Explanation of Codes for the Nest Check Data Sheet

1. Nest Site Location

Each time you visit the nest, record the date and any pertinent information about the nest contents and progress of the nesting attempt.

Year—Indicate the four-digit year in which this nest attempt occurred. If the nest attempt spans December and January, indicate the year that the attempt began.

Species—Please take care to identify the host species correctly. Consult a field guide or contact the NestWatch staff if necessary.

Nest Site Name—Use a unique name or number for each nest site you monitor. This will help you manage your nest sites online.

Nest Location—Enter information about the nest location either by providing the closest street address, city, and state *or* by entering latitude and longitude (decimal degrees) which can be found via our online Google maps tool. If using our mobile app, a nest check data sheet is not needed, but location is recorded at the nest site. Make sure you enable use of location services on your device for this feature.

2. Nest Site Description

Please provide as much information about each nest's site description and habitat as possible. You only need to do this once for each nest, but you can edit this information online if the description changes.

Nest Substrate—This describes the position of the nest (in, on, or under) relative to the surface on which the nest is built. For example, it can be in a nest box, on a tree branch, under a bridge, etc. Note: this is a required field in the online database. See page 27 for images of nest substrate types.

Immediate Habitat Within One Meter—This refers to the immediate habitat within one meter of where the nest resides. Draw an imaginary circle (1 meter in diameter) around the nest and determine the habitat type. See page 27 for habitat descriptions and images.

Dominant Habitat Within 100 meters—This is the dominant landscape type within 100 meters of the nest, and the likely area where the bird is foraging. Scan the area surrounding the nest (an area about the size of a football field) and determine which habitat type is most dominant. See page 27 for habitat descriptions and images.

Habitat Modifier—If you selected "human modified" for the immediate or dominant habitat type, please describe the type of modification (e.g., yard, airport, campground, power line, etc.). See page 27 for habitat descriptions and images.

Height Above Ground—Measure the height from the ground to the bottom of the nest. For nests on the ground, please record zero. For nest boxes, record the height up to the bottom of the entrance hole. Your measurements can be rounded to the nearest 100th (2 decimal places). This facilitates recording inches e.g., 10 ft. 1 inch = 10.08 ft. In this case, 1/12th of a foot can be calculated as follows: 1 divided by 12 = 0.08.

Cavity Orientation—For a natural cavity or nest box, record the direction (N, S, E, W, NE, NW, SE, SW) that a nest hole entrance faces, if known.

Cavity Width—For a natural cavity or nest box, record the diameter of the entrance to the nest. Your measurements can be rounded to the nearest 1,000th (3 decimal places). This facilitates recording 1/8ths of inches; e.g., 2 1/8 in = 2.125 in. In this case, 1/8th of an inch can be calculated as follows: 1 divided by 8 = 0.125.

Predator Guard—For a nest box, record whether there is a predator guard installed, and if so, the type(s).

You can print out the Nest Check Data Sheet from bit.ly/NWDataSheet. Use a separate data sheet to keep track of each nesting attempt.

Dealing with Uncertain Counts

If you are certain that eggs or young are present, but you can't get an exact count, record "u" to indicate that at least one egg or young is present, but that the exact number is unknown. If nest contents are not visible, you should either leave that visit blank or not submit the visit at all.

3. Breeding Data

The items below correspond to the columns on the Nest Check data sheet.

Date—Enter the month and day each time the nest was monitored.

Host Species

Provide information about the number of eggs and young for the species that built the nest.

# of Eggs—The highest number of host eggs counted (not including parasitic eggs) for each nest visit.

# of Live Young—The highest number of host's live young counted for each nest visit.

# of Dead Young—The highest number of dead young (not including young of cowbirds) for each nest visit.

Report All Nests

Be sure to report all active nests you visit, even if they fail to fledge young. We need your help in learning about why nesting attempts fail just as much as why they are successful.

Status/Activity Codes

Describe the status of the nests, adult activity, and stage of development of the young birds. Additional information can be included in the comments section.

Nest Status—Choose a code (see page 30) to describe the condition of the nest every time you visit.

Adult Status—Choose a code (see page 30) to describe the activity of adults seen or heard near the nest.

JOEY JOHNSON

Mourning Dove with two nestlings.

Young Status—Choose a code (see page 31) to describe the developmental stage of the young birds each time you visit the nest.

Management Activity—Choose a code (see page 31) to describe any action taken at the nest (such as banding young or cleaning a nest box) during the visit.

Details, Optional

Additional information regarding cowbird parasitism and observers can be included here.

Cowbird Evidence—Cowbirds lay their eggs in the nests of other birds, a behavior known as "brood parasitism" (see next page). Please provide information about the number of cowbird eggs and number of live and dead cowbird young (if any).

Observer Initials—Optional, but helpful if you are tracking multiple nest monitors.

Comments—Provide additional information about a nest visit or the outcome of a nest attempt.

The Last Nest Visit

It is critically important that you try to monitor each nest attempt through to the end. Even if you can't monitor as often as the protocol suggests, you should try to visit at the end of each nesting attempt so that we may know the outcome for each nest. Keep in mind that you cannot assume all of the chicks have fledged if the nest is not checked regularly. Use "Unknown outcome" if you cannot be sure of the nest fate.

Brood Parasites: Brown-Headed Cowbirds

Kathleen Stoekle

Brown-headed Cowbird egg in a House Finch nest.

Brown-headed Cowbirds are brood parasites, that is, they do not build nests, incubate eggs, and care for young. Instead, the female deposits as many as 40 eggs per year in nests that belong to other bird species. More than 100 other species have provided host nests for cowbird eggs. The female cowbird finds these nests by watching patiently from an observation post. She typically chooses a nest with eggs smaller than her own and lays a single egg quickly at dawn once the host has also started laying eggs. Brown-headed Cowbird young do not evict their nest-mates, although the female cowbird may remove and sometimes eat eggs from the host nest. However, cowbird nestlings typically outcompete their smaller nest-mates for food. This species is often confused for being invasive, however Brown-headed Cowbirds (and their eggs) are native to North America and protected under the Migratory Bird Treaty Act of 1918.

Joan Wiitanen

A female Brown-headed Cowbird.

4. Summarizing a Nest Attempt

In addition to reporting nest visits, participants should summarize each nest attempt. A Nest Summary provides a snapshot of the timing of key events (e.g., first egg date, hatch date, fledge date) and total numbers of eggs, young, and fledglings for each nest attempt.

Nest Summaries

Nest Summaries are required to complete a nesting attempt. You should not add a new nesting attempt at a given location until the attempt in progress is summarized. However, you can submit just the summary without the individual nest visit data, if you know the fate of the nest.

Important Dates

For each important date, please tell us whether it was estimated or observed.

First Egg Laid Date—Record the month and day that the female laid the first egg.

Hatch Date—Record the month and day that the first egg hatched.

Fledge Date—Record the month and day that the first young fledged from this nest.

Totals

Total Visits to Nest—Record the total number of times you actively checked this nest.

Clutch Size—Record the maximum number of host eggs counted in the nest.

Total Unhatched Eggs—Record the maximum number of eggs that failed to hatch for this nest attempt. Do not include eggs that were taken by predators.

Total Live Young—Record the maximum number of live young of host species in the nest.

Total Fledged Young—Record total number of young that fledged (left the nest) for this nest attempt.

Bryant Melton

Barred Owl fledglings venturing out of the nest box for the first time.

Submitting Data Online at NestWatch.org

- If you have previously created a username for The Birdhouse Network, NestWatch, eBird, or for any other online project with the Cornell Lab of Ornithology, please enter your existing username and password. You can request a username/password reminder email by clicking on "Forgot password?" on the sign-in page at **NestWatch.org**. If you haven't participated in an online Cornell Lab project before, click the "create account" button on the sign-in page.
- After logging in to your NestWatch account, click the "Your Data" tab. Complete instructions are provided online for entering your data.
- You can edit or delete information for up to one year after it is entered. Once the data are in our system for more than one year, you will need to contact us to change any historic data.
- You can begin entering data online any time after you begin monitoring. There is no need to wait until the end of the nesting season.
- Check the "Frequently Asked Questions" section listed under the "Learn" tab for additional help.
- You can also download the NestWatch mobile app, and sign in with your username and password to enter data in the field.

Dealing with Nest Box Predators

Although nest boxes provide nesting opportunities for many native birds, they also can make easy targets for predators. Common predators of nests in nest boxes include raccoons, cats, snakes, and squirrels. Here are some tips to help you thwart these common nest box predators.

Raccoons and Domestic Cats

Raccoons and cats are abundant in both rural and suburban areas. Raccoons are especially difficult to deter because they are very intelligent. Once they learn that nest boxes are good sources of food, these nocturnal creatures have been known to destroy nests in entire groups of boxes. Similarly, cats can quickly learn that nest boxes can be the source of an easy meal. When raiding nest boxes, both raccoons and cats will sit on the roof and "dip" into the entrance hole with their front paws to grab the eggs or young birds inside.

Ways to prevent raccoons and cats from raiding your boxes:

- Install a roof that extends 5 inches beyond the front of the box to prevent these animals from easily reaching into the entrance hole from above.
- Mount your box at least 10 feet away from trees or strong branches to reduce the number of jumping-off points for cats.
- Attach predator guards to your boxes to prevent these animals from climbing up from below. Three commonly used guards are shown under "Predator Guard Examples" on page 17.
- Keep domestic cats indoors.

Snakes

TERRI SANDVIK

A Texas rat snake found in an Eastern Bluebird nest box.

Snakes are a common predator of eggs and nestlings, especially in southern states. A conical metal collar mounted below the box will prevent most snakes from climbing up from below, but very large snakes can occasionally circumvent these barriers. In this case, it is helpful to have a Noel predator guard installed as a backup. Also, nest boxes should be placed away from trees to prevent snakes from accessing them from overhead branches.

Squirrels

In some regions, squirrels do great damage to nest boxes. By chewing at entrance holes to enlarge them, they make it easier for themselves and other predators to enter. If squirrels are common in your area, simply cut a hole the same size as the nest box entrance hole in a rectangular piece of sheet metal

and attach it to the front of the nest box so that both holes line up.

Fire Ants

Fire ants, common in the Southeast, can be attracted to active nests. To prevent them, add a baffle (see below) to your freestanding pole. Then, caulk the area between the baffle and the pole to prevent the ants from getting in between them and add petroleum jelly to the pole just below the caulk. The baffle keeps the petroleum jelly from washing away in the rain and the petroleum jelly prevents the ants from getting a good grip on the pole.

Predator Guard Examples

Stovepipe baffle

This device is made from a piece of stovepipe or PVC pipe that encircles the nest box pole. It is held in place by hardware cloth and straps and prevents predators from accesing the box via climbing up the pole.

Glenda Simmons

Raccoons thwarted by a Stovepipe Baffle

Noel predator guard

The Noel guard is a rectangular tube of hardware cloth stapled to the front of the nest box. This will make it difficult for predators to reach into the box entrance hole; however, the nest box occupants can easily come and go.

Mary Fredenburgh

Noel Guard on an Eastern Bluebird nest box.

Conical metal predator guard or collar

This guard works well for boxes that are attached to free-standing poles. The collar is a made from a circular piece of galvanized sheet metal that is placed around the pole underneath the nest box.

Managing Nest Box Competitors

Sometimes nest boxes are used by species for which they were not intended. Wasps, mice, squirrels, and other wildlife can compete with native cavity-nesting birds for nest sites. Here are some tips for discouraging nest box competitors.

Bees

Texas Bluebird Society

Nest box colonized by bees.

Bees are important pollinators of the wild foods that birds need to survive. However, they do sometimes take over nest boxes. To minimize the likelihood of bees colonizing your boxes, keep them plugged until just before the breeding season of the target species. If bees have already moved into your box, it is best to contact a professional pest management company or beekeeper to remove the insects because bees will vigorously defend their colonies. Africanized bees, which are becoming much more common in the United States, look very similar to native bees but are much more aggressive. You should not attempt to remove a bee colony without professional help. Once they have been safely removed, clean out any combs or wax in the box with soapy water.

Paper wasps

Jim Webber

Native paper wasp

Paper wasps sometimes construct hanging colonies from the interior roof of nest boxes in the early spring. The European paper wasp, introduced to North America in 1980, is quickly increasing its range in the eastern United States. The European paper wasp is black and yellow, similar to the yellow jacket,

and is slightly smaller than our native brown and tan common paper wasp. The European wasp prefers to nest in cavities, and it becomes aggressive with much less provocation than the native paper wasp. Unlike the common paper wasp, the European paper wasp often uses the same nest year after year, resulting in early nesting and larger nests.

Seldom do wasps usurp boxes from nesting birds. They are mostly found in empty boxes. If these insects are found in a box, it is best to leave them alone and not take any active measures to exterminate them. Instead, wait to evict them until the fall when the weather is cooler and their activity has halted. You can prevent wasps and bees from establishing themselves by applying a thin layer of bar soap on the inside surface of the roof. This will create a slippery surface between the insects and the roof of the box. To prevent them from establishing colonies, keep nest boxes plugged until just before the breeding season of the target species begins. Do not spray any pesticides into the nest box under any circumstances. The residue may remain even after cleaning and harm future nestlings.

Lynette Schimming

European paper wasp

Mice

Mice usually don't become problematic in nest boxes until they begin to build their nests for the winter. Because this happens after birds have finished breeding, most nest box monitors do not evict mice, and instead allow them to nest in their boxes throughout the winter. These boxes need to be cleaned out in early spring, however, or birds will not use them. Wear gloves and a dust mask when cleaning out old mouse nests. Alternatively, you can plug boxes in winter.

Jonathan Morgan

A mouse nest.

Squirrels

Squirrels occasionally compete with birds for nest boxes, and the timing of their litters does overlap with the breeding season of nesting birds. If a squirrel nest with young is found while checking nest boxes, it is best to wait until the nesting attempt is finished to clean out the box. State laws protecting native mammals vary and typically do not allow for the removal of active nests without a permit, unless they are inside buildings. Some squirrel species will produce two litters per year (spring and fall) and may use the same box for both attempts. It takes about 60 days for a litter to become independent and stop visiting the nest. If squirrels become more than just an occasional guest, prevent them from reaching the box by installing proper predator guards and by locating the nest box away from any tall trees.

Robyn Bailey

Flying squirrel in a nest box.

House Wrens

House Wrens are sometimes considered problematic. These sprightly birds are very territorial and may use similar tactics as House Sparrows to evict nesting pairs from their nests. Unlike the House Sparrow and European Starling, House Wrens are native and protected by the Migratory Bird Treaty Act. You may not legally remove nesting material, eggs, nestlings, or adult House Wrens from a nest box. If House Wrens are not wanted, wait until after the breeding season is over to move your nest boxes away from shrubby areas, which are prime House Wren habitat. Another solution is to place an additional box or two in good wren habitat. This will give them a place to nest and decreases the chance that they will usurp boxes meant for other species.

Douglas Wipf

House Wren nest on top of a Chickadee nest.

Managing House Sparrows and European Starlings

Please note that the methods described below are only for controlling House Sparrows (Passer domesticus) and European Starlings (Sturnus vulgaris), which are not protected by the Migratory Bird Treaty Act. It is illegal to harm or harass any native species, including their nests and eggs.

Invasive exotic species are those introduced species which benefit from their new environment and increase their population range significantly over time. Invasive species are currently recognized as one of the main threats to global biodiversity. House Sparrows and European Starlings were both introduced to North America in the 19th century. They are now permanent residents found across the United States and Canada, almost always near areas of human habitation and disturbance (e.g., cities and suburbs) or areas with a reliable food source, such as barns or granaries. Both species nest in structures ranging from gutters and downspouts to thick shrubs and bushes, but readily use nest boxes when available. They out compete native cavity-nesting birds, are known to destroy nests and eggs, and kill nestlings and adults while taking over an occupied nest site.

Emily T. Nelson

European Starling (sexes alike)

Deterring House Sparrows and European Starlings

As a nest box monitor, your goal is to provide a safe environment for local cavity-nesting species to breed. For the reasons outlined above, we strongly encourage you not to allow House Sparrows or European Starlings to breed in your nest boxes. We recommend that you take measures to prevent them from breeding in your boxes. Unfortunately, a completely sparrow-proof nest box does not exist. There are several styles that seem to deter the sparrows for a while, but ultimately if these birds are desperate, they will eventually use the box.

Because European Starlings are a larger bird, they are less of a problem when it comes to competition with bluebirds and other smaller cavity-nesting species. Simply restricting the size of the entrance hole of a nest box should be enough to give the smaller birds access while keeping starlings out. If your target species are larger cavity-nesting birds, like American Kestrels, you may have to actively deter starlings from your area.

Passive Control Methods

Placement

The most successful method for preventing exotic species from breeding in your nest boxes is simply to move your boxes. Only place your boxes in areas that do not have these birds. House Sparrows and starlings prefer to be near human habitations, and starlings also frequently inhabit agricultural areas with abundant grain. Therefore, placing your nest boxes in natural areas away from densely-populated locations will prevent many non-target birds from ever finding them.

Avoid Feeding

Another simple way to reduce the number of House Sparrows and European Starlings around your property is to avoid feeding them. House Sparrows prefer smaller seeds like millet, cracked corn, and milo, which are plentiful in inexpensive bird seed mixes. European Starlings, on the other hand, like premium black-oil sunflower seeds. If you feed

Susan Szeszol (both)

Female (left) and male (right) House Sparrows

wild birds, offer foods that these species do not appreciate, such as safflower for Northern Cardinals, nyjer or "thistle" seeds for finches, and nectar for hummingbirds. Avoid putting out mealworms and suet, and scattering seed on the ground. Feeders with short perches and small ports are also less attractive to these two species.

Timing

Because House Sparrows and European Starlings do not migrate, they have a competitive advantage when it comes to having first pick of suitable nest boxes. By waiting to open your nest boxes until migratory birds return, you can ensure that they have a better chance of finding an unoccupied site. Simply plug the entrance hole of your boxes until nesting season begins. Note that this means that your resident chickadees, titmice, and nuthatches may also have to wait for the migrants to return.

Exclusion

Starlings cannot squeeze through a hole smaller than 1 ½ inches, so an entrance hole of this size or smaller will exclude starlings from boxes intended for smaller birds. House Sparrows can fit through entrance holes as small as 1¼ inches, therefore, most cavity-nesting songbirds using nest boxes are vulnerable to House Sparrow competition. There is currently no scientifically documented way to exclude House Sparrows that works permanently. Your best bet may be to use a more active method of managing House Sparrows.

Active Control Methods

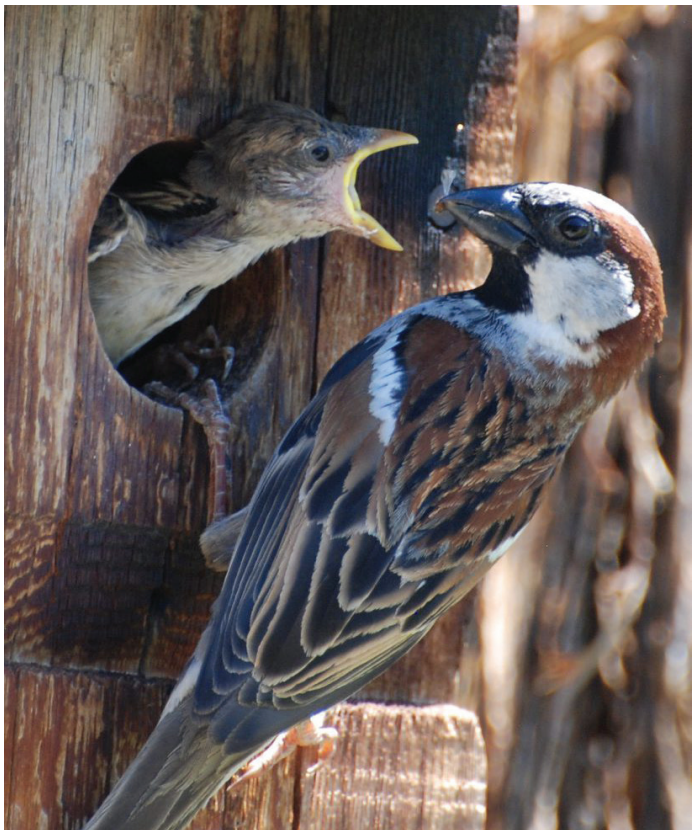
Because House Sparrows and European Starlings are exotic species, they are not protected by the Migratory Bird Treaty Act. Therefore nest box monitors are legally allowed to remove or harass them. Below we list some humane, legal actions for controlling or deterring these two species.

Nest Removal

Once House Sparrows have started nesting, you can remove their nesting materials every few days to discourage them. You may have to continue doing this for at least a week before the birds will tire of continually building a nest that is never completed and move elsewhere. While it is true that the birds will eventually seek a new nesting site, a second problem arises if they find a new site in another nest box that contains an active bird nest. House Sparrows can usurp the nest, often killing the inhabitants of the nest box. Therefore, you may wish to consider other options.

Egg Oiling and Addling

Another method involves tricking the birds into incubating eggs that will never hatch. The logic behind this method is that the adults will remain occupied with their nest and leave the native birds in your area alone. Addling (vigorously shaking the eggs) renders them nonviable, and the female will continue to incubate for longer than the usual incubation period. An easy way to oil eggs is to spray them with a sprayable vegetable oil (e.g., Pam), then return them to the nest. The drawback to this method is that the birds will eventually lay another clutch, so you still need to re-treat the eggs after the bird re-lays. Additionally, addled eggs can still hatch if not done correctly, but egg-oiling is consistently effective. Many experienced nest monitors concede that nest removal and prolonged incubation are temporary stop-gaps and not long-term solutions; they work best once nesting is already initiated by the unwanted species and the monitor is unable to effectively trap the adult exotic birds.



Marlene Ralph

A House Sparrow feeds his young.

Trapping

Where populations of exotic species are high, trapping may be the only effective means of managing invasive species. Once you have a bird trapped, it is best to humanely euthanize it as soon as possible to avoid unnecessary stress to the bird. Traps must be checked hourly to ensure that no native birds become trapped, and trap operators should have the necessary identification skills to ensure that only House Sparrows or European Starlings are detained. There are several humane methods for trapping exotic birds, such as:

- In-box trap
- Funnel trap
- Trio trap
- Repeating (Elevator) trap

While no wildlife manager enjoys euthanizing an invasive species, it is more upsetting and discouraging to find the injured or dead victims of attacks in your nest box. Many raptor rehabilitation facilities will accept sparrows that have been euthanized humanely and without the use of chemicals. The North American Bluebird Society (**nabluebirdsociety.org**) provides additional details on House Sparrow control and may have state or provincial affiliate members who can advise you on effective deterrents for your region, state regulations on wildlife relocation (relocating trapped wildlife is usually illegal), and local organizations that accept harvested sparrows and/or starlings.

NestWatch in the Classroom

Thinking of getting your classroom or informal learning group involved with NestWatch? In October 2018, NestWatch published its first curriculum, titled *Thinking Outside the (Nest) Box*, created in partnership with the Sustainable Forestry Initiative® and New York State 4-H.

The curriculum guides educators and students through five activities that cover topics about habitat, building and installing nest boxes, life cycles, proper monitoring and observation of nesting birds in North America, and data collection and analysis. The activities are geared towards students in grades five to eight but can be scaled up or down to fit your group's needs. It includes lessons, worksheets, a list of all materials needed for each activity, and links to the accompanying resources that are available on our website. Also included are a glossary of terms and a table which aligns all activities to the national Next Generation Science Standards and Common Core Standards for grades five through eight.

Thinking Outside the (Nest) Box is available as a free download from the Cornell Lab K-12 Education webpage (**birds.cornell.edu/k12/nestwatch**). The curriculum and accompanying slideshow focusing on North American species are also available in Spanish (**birds.cornell.edu/k12/piensa-fuera-de-la-caja-de-nido**).

Frequently Asked Questions

Q: Who can participate in NestWatch?

A: Anyone! Our participants are people of all ages who care about the natural world. They range from families with children to retired adults and professional biologists who monitor nesting birds in backyards, parks, green spaces, and public lands. There is no charge to participate in the program.

Q: How do I join NestWatch?

A: Go to **NestWatch.org** or download the NestWatch mobile app. If you are not already registered, please click on the "Sign In" link and click on the option "Create Account." You will need to create a username and password. Shortly after you register, you will receive an email confirming your registration and containing your username and introductory information.

Q: What do I need to participate?

A: The most important requirements are a bit of time, an interest in birds, and either: a mobile device with the NestWatch mobile app downloaded, or a pen, clipboard, and data sheets. In addition, binoculars and a field guide to birds and/or bird nests may be helpful. To report data, you will need internet access. Our mobile app allows data to be recorded in "offline mode" while you may be out of service; however you must later connect to the internet in order to sync your data to our database.

Q: How do I participate?

A: Collect information on the location, habitat, species, number of eggs, and number of young in each of the nests you monitor. You'll submit your nest records online, either on the website or on our mobile app.

Q: Can I be a NestWatcher as part of a community or group?

A: Absolutely! In fact, many people work with friends, family, or neighbors to monitor large nestbox trails or conduct surveys for state-sponsored Breeding Bird Atlases. We encourage individuals new to nest monitoring to get involved with one of our chapters. These chapters are located throughout North America and occasionally hold workshops to get people started in the rewarding activity of nest monitoring. See page 35 for a link to our chapter map.

Q: What species do you want data for?

A: We will accept data on ALL breeding birds. Explore Common Nesting Birds that are native to North America, including migratory status, nest type, and range. These species are commonly found in rural, suburban, and urban neighborhoods, making them easily accessible for nest monitoring.
For more information about these species' nesting biology and to view photos of nests and eggs, visit: **nestwatch.org/learn/focal-species**.

Explore these Common Nesting Birds

American Goldfinch
American Kestrel
American Robin
Ash-throated Flycatcher
Barn Swallow
Bewick's Wren
Black-capped Chickadee
Black-headed Grosbeak
Blue Grosbeak
California Scrub-Jay
Carolina Chickadee
Chestnut-backed Chickadee
Dark-eyed Junco
Eastern Bluebird
Eastern Phoebe
Eastern Towhee
Gray Catbird
Great-crested Flycatcher
House Finch
House Wren
Indigo Bunting
Juniper Titmouse
Killdeer
Lazuli Bunting
Lesser Goldfinch
Mountain Bluebird
Mountain Chickadee
Mourning Dove
Northern Cardinal
Northern Mockingbird
Oak Titmouse
Purple Martin
Red-winged Blackbird
Rose-breasted Grosbeak
Say's Phoebe
Song Sparrow
Spotted Towhee
Tree Swallow
Tufted Titmouse
Violet-green Swallow
Western Bluebird
Woodhouse's Scrub-Jay

More info:
nestwatch.org/learn/focal-species

Q: Is there a certain form I should use to collect nesting data?

A: Unless you are using our mobile app, Yes! On our website you will find the Nest Check data sheet. This form allows you to gather information about the location, nest substrate, habitat characteristics, and observations of nesting progress during each visit. The Nest Check data sheet is intended for use in the field. It mirrors the web-based form, making it easy for you to transfer your data online. See pages 17–18 for complete instructions on filling out this form.

Q: How often should I visit a nest?

A: There is no set standard for how often to visit a nest; however, too many nest visits can lead to nest abandonment by the parents and too few visits can result in data that are difficult to analyze and interpret. As a general rule, we recommend every 3–4 days, which will add up to roughly 8–10 visits. We strongly encourage visitng at least once a week so we can meaningfully interpret your observations. Please review the protocol on page 13 for more information.

Q: Can I monitor nest boxes?

A: Yes! The effects of providing nest boxes for cavity-nesting birds are not well understood, and more data are needed to address this issue. Additionally, nest boxes are a great way for beginners to get started with nest monitoring.

Q: Should I report nest failures?

A: YES! In addition to knowing when nests succeed (at least one young fledges from the nest), we also need to know when they fail (no young fledge from the nest). Reporting only successful nests will bias the data and give us an inaccurate picture of how bird popualtions are faring.

Kevin Seiple

Carolina Chickadees in the nest.

Q: How do I enter my nesting observations online?

A: First, go to **NestWatch.org** and log into your NestWatch account, then click on the "Your Data" tab along the top of the screen to enter the data management page. See page 26 for guidelines on submitting data or open the "Instructions" section online for help.

Q: How do I see my data?

A: Several online tools are available to make it easy to manage and organize your nesting records. In addition, data reporting features will allow users to view, download, and explore nest data submitted from anywhere in the world. Visit the "Explore Data" tab online to get started!

Q: Is there a way to participate online only?

A: Yes! Starting in 2019, NestWatch launched Nest Quest Go!, online-only project which aims to transcribe more than 300,000 historic nest-record cards in the Cornell Lab of Ornithology's collection. Learn more about the project at **NestWatch.org/nest-quest-go**.

Neva Scheve

A Pileated Woodpecker and her nestlings.

Q: What questions are researchers hoping to answer?

A: With the data gathered and reported by citizen scientists, researchers around the world have access to an incredibly powerful data set that grows each year. The database includes over 650,000 nest records from most of North America's breeding birds. Below are some of the critical questions that citizen-science data can answer:

- How do breeding parameters such as clutch size, nesting success, and daily nest survival vary across time and place?
- Can conservationists use nesting data to detect changes in the environment?
- What factors limit breeding success in areas from rural to urban?
- What actions can people take to help breeding birds?
- More details about publications using NestWatch data are available online.

Q: What can participants hope to learn by participating in NestWatch?

A: NestWatch was developed in part to increase public understanding of science and to teach people about the breeding biology of birds. We hope participation will result in greater understanding of how science is conducted and contribute to knowledge about the breeding behaviors of birds. We further hope that participants will develop their nest-monitoring skills and learn how human impacts on the landscape can greatly affect nesting birds.

CHARLES WEBB

A Carolina Wren and its nestlings.

Q: Why is nest monitoring important?

A: As a NestWatch participant, your nest observations become part of a worldwide database that will allow us to better understand and manage the impacts of environmental change on bird populations. In addition:

- Studies of nesting birds can increase our understanding of population ecology, conservation biology, and behavioral ecology.
- Because nesting birds often compete intensely for a limited number of suitable breeding sites, many species are decreasing in number.
- The biological effects on bird populations of providing and monitoring nest boxes are not well known.
- Nest monitoring increases our connection to and appreciation for birds and the natural world.

NestWatch Mobile App FAQ

Q: How do I download the NestWatch mobile app?

A: Open the Apple App Store or the Google Play Store and search "NestWatch" to find our app. Your device must have iOS8 or later, or Android version 6 or later to work properly. If you do not have a smartphone or tablet, you can use the NestWatch website to enter your nest sites and nest visits.

GET IT ON Google Play

Download on the App Store

Q: What is my username and/or password?

A: You can use the same username and password you use with NestWatch.org. If you don't have a username already, click "create account" from the app's sign-in page and follow the prompts. You can also use the "Forgot Username?" and "Forgot password?" links to get a reminder email containing your username, or an email to reset your password.

Q: Will the NestWatch app work without internet or cell service?

A: Yes, it does! If you frequently find yourself off the beaten path without internet or cell service, NestWatch has an offline mode. The next time you are online, open the NestWatch app so that the data will sync to the NestWatch server.

Q: I am monitoring nest boxes as part of a group. Can we all enter data through the app?

A: Yes, everyone who is monitoring will need to log into the app with the same username and password. Please be aware if people are entering data simultaneously, you may not see a complete view of the data until the app fully syncs to the server.

Q: Can I upload photos to the app?

A: Yes! Just as you are able to do so on our website (NestWatch.org), you can upload up to three photos per nest visit. When taking photos, remember to keep your visit to under one minute and that handling nests, eggs, or nestlings is against federal law without the proper permit.

Q: I'm having trouble using the app. How can I get help?

A: Please check our full FAQs to see if they answer your question (nestwatch.org/learn/how-to-nestwatch/faqs). If you don't find an answer, please fill out our Contact Us form (nestwatch.org/nw/contact). Be sure to include your phone's make and the version of its operating system (i.e. iPhone XR iOS12.2) and the specific issue you are encountering. Screenshots of the issue are always helpful. To take a screenshot on an iOS device, press the power and home screen button at the same time. On Android, press the power and volume down button at the same time. Look in your photos to find and share the screenshot.

Chelsea Benson

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KEVIN MCGOWAN

Black-capped Chickadee with nesting material.

Appendices

APPENDIX A: Nest Substrate Types

Images below represent the types of surfaces that nests may be **in**, **on**, or **under.**


Snag or dead tree cavity


Live tree cavity

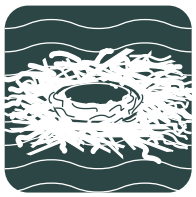

Nest box or birdhouse


Building or dwelling


Cliff or rock


Post, pole, or platform


Ground


Floating vegetation


Live tree branch


Dead tree branch


Bush, shrub, or cattails

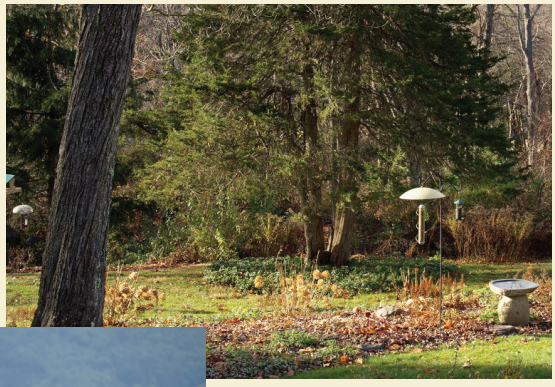

Other

APPENDIX B: Habitat Description Codes

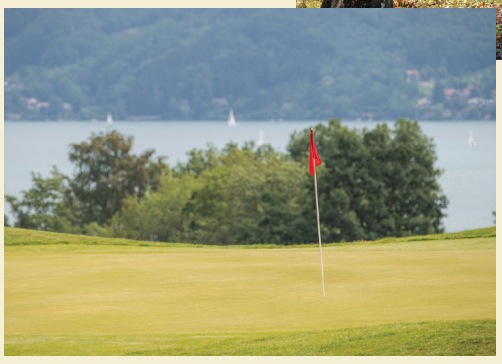
When describing your nest site, enter descriptions for immediate habitat type within 1 meter of the nest and for the dominant habitat type within 100 meters of the nest. If the habitat type is human modified, choose the type of modification from the list below.

Human Modified Habitats

Yards, residential areas
Public park/green space
Roadside
Golf course
Landfill/gravel pit/strip mine
Cemetery
Industrial/commercial area
Power/Utility corridor
School/campus/church/hospital
Airport
Campground
Christmas tree farm
Orchard/vineyard
Recently clear-cut area
Recently burned area


LAURIE CHISHOLM

Yards and residential areas


MICHAELA PUCHER | CROPPED | CC0

Golf course

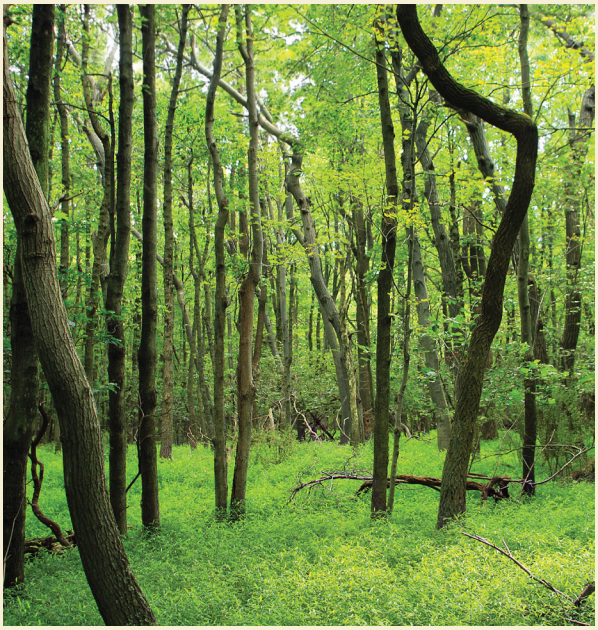
Agricultural Area

Includes cropland, pasture, and tree plantations—vegetative cover dedicated to the systematic production of food, feed, fiber, livestock, and other goods.

Carsten Frenzl | cropped | CC 2.0

Woodland/Forest

Dominated by deciduous and/or coniferous trees, generally with a distinct canopy, though it can have some open areas.



Nicholas A. Tonelli | cropped | CC 2.0

Natural Grassland/Prairie

Grassland and savanna including all native prairies, aspen parklands, and other natural grasslands. Precipitation is highly variable but usually very seasonal. Areas are dominated by grasses and forbs (herbs), but may include scattered shrubs or trees.

Joshua Mayer | cropped | CC BY-SA 2.0

Chaparral/Shrubland

Chaparral and shrubland are characterized by long, hot, dry summers and cool, wet winters. Although the habitat is globally rare, it features an extraordinary biodiversity of animal and plant species uniquely adapted to the stressful conditions of long, hot summers with little rain. Most plants are dependent on fire disturbance for their survival.

David Baron | cropped | CC BY-SA 2.0

Desert Scrub

Deserts and xeric (dry) shrubland vary greatly in the amount of annual rainfall they receive (usually less than 250 cm or 10 inches) and in temperature (some become quite cold in winter), but evaporation typically exceeds rainfall in these regions. A rich array of woody-stemmed shrub and plant communities can occur under these extreme conditions, many of which are transitory, reflecting the seasonality of available water.

KEN LUND | CROPPED | CC BY-SA 2.0

Tundra

Tundra can occur both at high altitude (Alpine) and at high northern latitudes (Arctic). Alpine tundra lacks trees, but does not usually have permafrost, and alpine soils are generally better drained than arctic permafrost soils.

Arctic tundra usually refers only to the areas where the subsoil is frozen for much of the year, making it impossible for trees to grow. The land can only support low-growing plants such as mosses, heaths, and lichen. Rising summer temperatures melt the top permafrost layer causing seasonal lakes, bogs, and marshes to form. Precipitation (falling mostly as snow) is desert-like, with only about 15–25 cm (6–10 inches) falling annually.

PETR MEISSNER | CROPPED | CC 2.0

Freshwater

Freshwater habitats include lakes, rivers, creeks, streams and some marshes, swamps, and ponds.

RUTH HARTNUP | CROPPED | CC 2.0

Saltwater

Saltwater habitats have significant amounts of dissolved salts including oceans, tidal flats, and some bays, marshes, swamps, and ponds.

USFWS | PUBLIC DOMAIN

Beach

Sand, gravel, pebbles, and shells along the shoreline of a body of water.

REBECCA FLEMING | CROPPED | CC 2.0

APPENDIX C: Status/Activity Codes

Nest Status Codes

The codes below correspond to nest status codes on the Nest Check data sheet.

NO = No nest. Cavity, nest box, or platform with no nest present or for species that do not build any nest.

AN = New avian nest found. If you see a new bird nest built on top of an old one from the current season, treat this as a new nest attempt and begin a new form. Describe additional details in the comments section.

CN = Completed nest. Nest appears structurally complete, with an obvious nest cup.

DN = Damaged nest. Nest appears disheveled and/or torn apart.

FN = Flattened nest with fecal matter. This is evidence that nestlings were present—their weight flattened the nest and they left fecal droppings behind.

IN = Incomplete nest. Evidence of nesting material; nest building appears to be in process, but not quite finished.

NN = Non-avian nest. Evidence of a nest that was not built by a bird (e.g., wasp, mouse, or squirrel) in nest boxes or cavities. Describe details in the comments section.

RN = Nest removed, remover unknown. An active nest disappears for an unknown reason. Do not use this code if you know the reason for the removal of the nest (i.e., monitor, predator, blown out of tree, etc.)

Adult Activity Codes

The codes below correspond to adult activity status on the Nest Check data sheet.

NO = No adults seen or heard. During your nest check, you did not see or hear any adults near the nest.

AA = At/on, then flushed from nest. During a nest check, an adult flies out from the nest or nest box.

BA = Building nest or carrying nest material. An adult carries nest material to the nest site or sits on the nest while building it.

DA = Dead adult(s). Dead adult bird found at or near the nest site.

FA = Feeding young at nest. A parent carries food to the nest or drops food into the open mouths of nestlings.

RA = Remained on the nest. During a nest check, the adult remained on the nest.

VA = Remained in vicinity. During a nest check, parents are seen or heard in the vicinity of the nest or nest box.

Complete nest

Damaged nest

Flattened nest

Incomplete nest

TINA PHILLIPS (4)

Young Status Codes

The codes below correspond to young status codes on the Nest Check data sheet.

NO = No young present.

HY = Hatching young. A chick is emerging or has just emerged from an egg.

NY = Naked young. Altricial nestlings with little or no down or feathers.

PY = Partially feathered. Outermost flight feathers on the wing are emerging, encased within a pointed sheath, OR feathers have broken through the sheath and have a stubby brush-like appearance, OR the flight feathers appear fully grown but tail feathers and body feathers are not yet complete. Some skin is visible.

FY = Fully feathered young. The tail feathers are short and most body feathers are visible, little or no skin visible. Nestlings are well feathered and look ready to leave the nest (whether or not they can fly).

VY = Vocal young, heard only. Young in the nest were heard but not seen.

Management Codes

The codes below correspond to management status codes on the Nest Check data sheet.

NO = No management activity. No human management activities were conducted for this visit.

AM = Avian competitor nest/eggs/young removed. Indicates that you are discouraging the nesting attempts of House Sparrows or European Starlings, two nonnative species that are not federally protected under the Migratory Bird Treaty Act.

BM = Banded adults or young at nest. Indicates that you banded adults or young at this nest. Note: banding birds requires a special permit.

EM = Unhatched host eggs removed. Indicates that you removed host eggs that never hatched.

NM = Nest box management. Activities include cleaning out nest boxes, plugging or unplugging nest boxes, or removing inactive nest of the host species from a next box.

PM = Pest management (e.g., wasps, ants, mice, etc.). Non-avian competitors such as wasp nests or other pests were removed. Please remember to use nontoxic pest control methods.

Eastern Bluebird by Doug Pieritz

Hatching young

Brown Thrasher by Don Abrams

Naked young

American Robin by Holly Faulkner

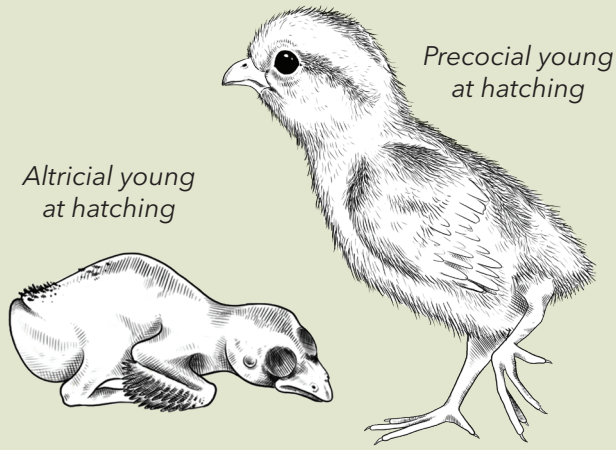
Partially feathered

Ruby-throated Hummingbird by Joe Gegg

Fully feathered young

Altricial vs. Precocial Young

Most songbirds are **altricial**, i.e., nestlings are generally helpless, immobile, naked, with eyes closed after hatching. The young of **precocial** species such as geese, are covered in down, can move around, and have their eyes open after hatching.



Illustrations by Megan Bishop, Bartels Science Illustration Intern

APPENDIX D: Overview of the Nesting Cycle

More than 700 bird species breed in North America, and the variations in their behaviors are fascinating and complex. Different species find mates, build nests, lay eggs, and raise their young in incredibly different ways. This overview is a generalization of avian nesting cycles. For more information about nesting cycles of individual birds, please visit our Common Nesting Birds tool at nestwatch.org/learn/focal-species.

Finding a place to breed

Gary Mueller

A male Blue-gray Gnatcatcher sings to establish his territory.

Throughout the year, day length is the cue that tells most birds what season it is, triggering physiological changes such as the readiness to migrate or to breed. Most birds, especially those in temperate regions, must time their breeding activities so they will be feeding their nestlings when food is most abundant.

Well before nestlings arrive, however, birds need to select a breeding territory. Resident species may keep a territory throughout the winter or look for a new one in spring. Migratory birds begin looking for and defending a territory or nest site as soon as they arrive in spring. Good territories provide nest sites, reliable food sources, and protection from predators.

Choosing a mate

While territories are being claimed, males and females also try to attract mates. Males often try to advertise their ability and their vigor by exhibiting bright breeding plumage and by singing, drumming, or calling.

Most bird species form a pair bond with the male and female staying together throughout the breeding season. It was once thought that nearly 90 percent of all birds were monogamous, but new evidence using DNA profiling has revealed that strict monogamy is not so common. Many birds may have a single social mate who helps raise the young, but they may actually have mated with additional partners. DNA analysis shows that even birds that presumably "mate for life," such as bluebirds and Bald Eagles, may not always be faithful. The nestlings in one nest actually may have been fathered by different males!

Emory Winship

A male Western Bluebird and several females check out a nest box.

Some birds are polygamous, forming social bonds with more than one bird of the opposite sex. Sometimes males have more than one mate at the same time (polygyny). Less commonly, females may have social bonds with more than one male (polyandry).

In most bird species, the female chooses her mate. This is one reason why males are often the "showier" or more colorful sex. Besides physical appearance, females also may assess factors such as nest site quality, vocal behavior, age, courtship displays, and the male's ability to provide food resources.

Nest building

Nests provide a safe place for the eggs and young. Bird nests are extremely diverse, although each species typically has a characteristic nest style. Some birds do not make a nest and simply lay eggs in a scrape on the ground or other substrate. Other birds may make nests from natural materials such as grasses, leaves, mud, lichen, fur, and dung, or man-

Scott Zimmermann

An Osprey adds a stick to its nest.

made materials such as paper, plastic, trash, yarn, and even barbed wire! Nests can be found almost anywhere—on the ground, in trees, in burrows, on the sides of cliffs, in or on man-made structures, etc. Females typically build the nest, but sometimes both parents or just the male will build it.

Copulation and egg formation

During the breeding season, hormonal changes cause the internal testes of males to swell to more than 1,000 times their normal size, and the ovaries and oviduct of females to increase in size in preparation for egg fertilization and egg development. During copulation, the male's cloaca contacts and ejects sperm into the cloaca of the female. The sperm travel to the oviduct where they can be stored for long periods in sperm storage tubules. If all goes well, the sperm penetrate through the wall of the ovum (egg) and fertilization takes place. During the first stage of embryonic development, known as the blastocyst stage, the egg shell develops. Ovulation and laying take about 24 hours, so females produce, at most, a single egg per day.

Martina Andres

Glaucous-winged Gulls mating.

Egg laying

The number of eggs a female lays in one nesting attempt (also known as clutch size) varies widely depending on the species. For example, many tropical birds have clutches of only two or three eggs. Waterfowl such as Wood Ducks can lay up to 15 eggs in one nesting attempt. Clutch size can also vary widely within a species depending on food and calcium availability, latitude, age of female, seasonal timing, weather, and time of year. The size, shape, color, and texture of bird eggs are also extremely variable.

Kelly Welter

House Finch eggs and nest.

Incubation

Birds incubate their eggs to keep them at the proper temperature to ensure normal development. Female songbirds usually begin incubation after they have finished laying all the eggs so that they will hatch at approximately the same time. Other birds, such as herons, cranes, cormorants, and raptors (eagles, hawks, and owls) begin incubating as soon as the first egg is laid, and the eggs may hatch on different days. In some species, both the male and female incubate eggs. Incubation time varies depending on the species, but typically, the larger the bird, the longer the incubation period.

Karla Wallace

A female American Robin incubates her eggs.

Hatching

Songbirds and most seabirds have altricial young—the newly hatched birds are blind, naked, and helpless. They remain in the nest where the parent(s) can feed them and brood them, sitting on them to keep them warm. Immediately after hatching, altricial birds can do little more than open their mouths to beg for food. Their mouths are often very bright and patterned. For a long time, scientists thought this helped guide parents to place food but further research has shown that it may also provide information on chick identity, health, and quality.

Emilee Weir

American Robin chick and egg.

Unlike altricial birds, precocial birds such as ducks and many shorebirds hatch fully feathered, mobile, and with eyes open. Incubation periods are longer for precocial birds than altricial birds, allowing for increased embryonic development in the egg, and therefore they have enhanced motor and sensory functions at hatching.

Feeding the young

For the first week of life, most altricial birds cannot control their own body temperature—similar to reptiles and other cold-blooded animals—and must be constantly brooded (kept warm) by the parents. Usually, by the end of the first week, their eyes are open and their feathers are beginning to emerge. During these first 10 days, nestlings experience remarkable growth—some are able to double their body weight several times!

To keep up with demand, parents must supply food for themselves and their young. This is an extremely dangerous time for the parents who are constantly foraging for food, and for the young, whose noisy cries for food may attract predators. After two to three weeks, most songbirds are usually ready to leave the nest. Other birds, such as birds of prey, may stay in the nest for as long as 8 to 10 weeks.

In contrast, precocial birds such as ducks and many shorebirds spend hardly any time in the nest. They are often seen wandering in search of food alongside their parents just hours after hatching. Most precocial birds gain the ability to fly within a few weeks to a few months after hatching.

Jim Shane

An American Kestrel delivers a meal to her nestlings.

Shirley Donald

A Common Loon carries its precocial chick safely on its back shortly after hatching.

Leaving the nest

After leaving the nest, or fledging, the young birds typically remain close to their parents for a short period of time. During this time, young birds must learn to survive on their own and are very vulnerable to predators and starvation. Most birds nest only once per year, but some species can nest up to four or even five times in one breeding season.

Laura Frazier

A Northern Mockingbird adult brings food to its fledgling.

Surviving on Their Own

After fledging the nest, young birds (juveniles) are faced with surviving on their own. The first year is the toughest, as evidenced by the fact that in nearly all bird species, more than half of first year birds die. For birds that do make it to adulthood however, the odds of surviving another year improve greatly.

Jerry Cahill

A young Green Heron learns to survive on its own.

APPENDIX E: Additional Resources

NestWatch
nestwatch.org

Cornell Lab of Ornithology
birds.cornell.edu

All About Birds
allaboutbirds.org

Birds of North America Online
birdsna.org

Cornell Citizen Science
birds.cornell.edu/citizenscience

BirdCams
cams.allaboutbirds.org

NestWatch Curriculum: Thinking Outside the (Nest) Box
birds.cornell.edu/k12/nestwatch

Anna's Hummingbirds by Soo Baus

NestWatch Chapters

NestWatch Chapters are based at nature centers, parks, wildlife refuges, zoos, and other nature-minded organizations across the United States. These organizations help us grow by teaching others about the NestWatch program and training participants in their local communities. In return, Chapters are able to use the NestWatch infrastructure to monitor *their* nesting birds on *their* properties. For information on how to become a Chapter, please email **nestwatch@cornell.edu**. To locate a NestWatch Chapter near you, visit **nestwatch.org/connect/nestwatch-chapters**.

This document has included accessibility features for those with visual impairments; for assistance contact nestwatch@cornell.edu.

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