FOCUS ON CITIZEN SCIENCE • VOLUME 17, NO. 1

NestWatch Digest

NESTING SEASON 2020

The Cornell Lab of Ornithology

A year like no other

Our annual report is a compilation of research highlights and data stories from the previous nesting season. Before you dig in, I would just like to acknowledge the hardship that 2020 brought and preface this report with well wishes for the safety and health of all NestWatchers, wherever you are in the world. Despite the many challenges we collectively faced, 2020 was our biggest season yet, with 31,529 nests entered. We welcomed a 36% growth in participation. We saw reports coming in from 42 countries, and noted that international nest records increased by 57% over 2019. We also fulfilled 8 external requests for data, some of which were from researchers whose field seasons were cut unexpectedly short. As you will see on page 18, 2020 also brought us one of the largest studies ever undertaken with NestWatch data!

New for 2020, we added an outcome code that lets us quantify the impact of nest site competition; this code enables you to tell us when a nest fails because it was taken over by another bird, and if applicable, which species did the usurping (see page 14 for more details). On a related note, we also published a new study in 2020 related to nest box competition from invasive species, the second of two planned studies based on our 2018 survey of people who monitor nest boxes (read the full story on page 6).

As we work from our home offices, our team is thankful for your support, generosity, kind words, and dedication to NestWatch under difficult circumstances. As we continue into our second nesting season under social restrictions, I hope that the beauty of birds and their nests brings you some joy and a sense of purpose, whether it is out on the trail or from your own front door.

With gratitude,

Robyn Bailey

NestWatch Project Leader

Cover: Mountain Chickadee by Christine Haines

American Robin nest by Sharon Wade

Focus on Citizen Science is a publication highlighting the contributions of citizen scientists. This issue, *NestWatch Digest*, is brought to you by NestWatch, a research and education project of the Cornell Lab of Ornithology. The NestWatch project is made possible by the efforts and support of thousands of citizen scientists. This document has accessibility features for those with visual impairments; for assistance contact **nestwatch@cornell.edu**.

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Join NestWatch!

Anyone, anywhere, who finds a nest is welcome to join. Help scientists monitor nesting birds while you support bird conservation in your own community. To join, visit **NestWatch.org** and get certified as a nest monitor. Certification is free and ensures that nest monitoring activities follow our code of conduct designed to protect birds and their nests.

The Cornell Lab of Ornithology

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What kind of nesting materials are best to provide for birds?

BY HOLLY GRANT, PROJECT ASSISTANT

Some birdwatchers and nature lovers like to celebrate the beginning of breeding season by providing nesting materials for use by the birds that will soon become their neighbors. Each spring we see a similar uptick in questions regarding which type of nesting materials are best to provide, ranging from pet hair, to dryer lint, to leftover yarn or fabric scraps. As a crafter myself, I too wish I could use my hobby to help birds, but these items are not usually the best options. With this in mind, I'll share our best tips below, which will help you to ensure the good health and safety of your local birds.

When providing nest materials, it's important to consider what your local species naturally use in their nests. Chickadee and phoebe nests, for example, are easily identifiable because they incorporate lots of bright green moss. Bluebirds and robins, on the other hand, make nests out of grasses and straw. So, when you're deciding what to place outside for the birds, we recommend sticking to natural items such as moss, twigs, leaves, lichen, rootlets, or untreated grass clippings (i.e., those that have not had fertilizer, pesticides or other similar chemicals applied). If you have chickens or other poultry, their feathers may also be used by birds such as swallows, wrens, or flycatchers, though be sure that the feathers have not had chemical treatments applied. You can gather these items and place them in an empty, clean suet cage, or simply provide them in piles in your yard or on a deck railing. Be sure to refresh the offerings after rain, or if you notice any mold or mildew growing on them.

As I alluded to above, two of my favorite hobbies are birdwatching and knitting. While common advice used to say that yarn was safe to put out for birds, we now know that advice is outdated. Yarns are not always made of natural materials (e.g., acrylic or nylon), and even wool and cotton skeins may be treated with chemicals or dyes that can harm the delicate skin of nestlings. Stringy materials are also harmful because they can potentially wrap around the feet or neck of nestlings, either trapping the bird in the nest (preventing fledging) or restricting airflow. Hair from humans, pets, and/or livestock can be harmful to nestlings as well. Strands of hair are often infused with shampoos, flea and tick treatments, or other similar products, and if it's longer than one inch, it poses the same risk as yarn and string. Hair, string, and yarn can also be choking hazards if mistaken for food. One other very popular idea is using dryer lint, but lint should never be provided for birds to use. The chemicals in detergents and the microplastics that may accumulate from synthetic fabric can be harmful. When considering these items, note that while you may have seen a bird using some in its nest before, it doesn't always mean those items are safe. By making safer materials more readily available, you can contribute to the health and safety of your new "nest"-door neighbors.

HOLLY GRANT

Be sure to provide natural materials for birds like twigs, untreated grass clippings, and leaves; avoid using string, hair, and dryer lint.

Birds don't need help from humans finding nesting materials, but if you do provide them, it's best to go natural. The intent when providing nest materials is to try to mimic what these birds would use in nature, and keeping to that strategy will be one more step in the right direction for a successful fledge.

Nest Quest Go!

By the numbers

BY BECCA RODOMSKY-BISH, NEST QUEST GO! PROJECT LEADER

American Robin by Zachary George

NestWatch's effort to digitize, transcribe, and integrate more than 300,000 historical nest records from the North American Nest Record Card collection continues! During the 2020 calendar year Nest Quest Go! completed 17 projects ranging in size from a few hundred cards to our largest project, American Robins, at 18,583 nest records.

Nest Quest Go! uses the Zooniverse platform to crowdsource nest record card transcription, and we organize these cards into individual "projects." What we discovered is that a range of 2,000 to 5,000 cards creates an ideal flow to this work, results in efficient project completion, and maintains steady transcriber engagement. This, combined with the appeal of multiple-species projects, has made for a fast-paced transcription year. We are humbled and grateful to each and every person who's helped with this endeavor. Your efforts have moved us closer to using valuable historical citizen-science data to better understand nesting bird populations in North America.

The graph below shows the total number of cards as well as the number of days, per 100 cards, that it took to complete transcription for each of the 17 projects.

Nest Quest GO!

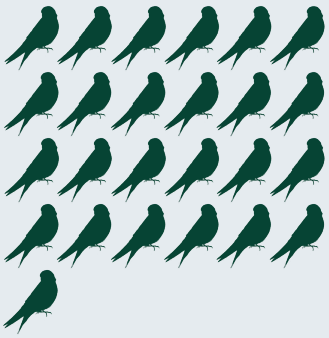
Good Words

"I just wanted to express my gratitude for this project. I will admit that prior to this, I was not a dedicated bird enthusiast, however, working on this project has absolutely changed that! ...this project has taught me a lot and sparked a completely new interest, all just from transcribing these cards! The idea that someone like me, a common citizen, can contribute and make a difference in these projects astounds me. It is my new favorite hobby. Keep it up!"

-Katie W

Transcription Progress 2019 - 2020

25 projects launched in Zooniverse

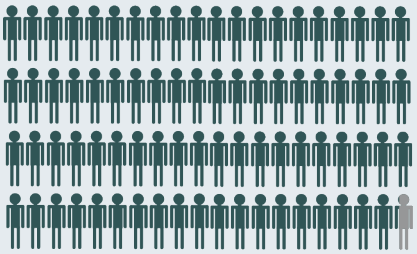


548

548 days of active projects

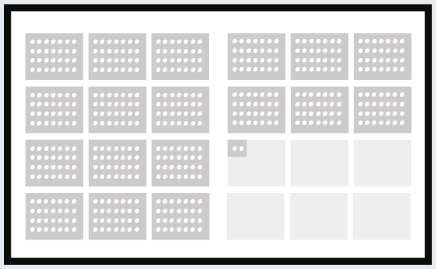
&

7,927 people transcribed data



= 100 people

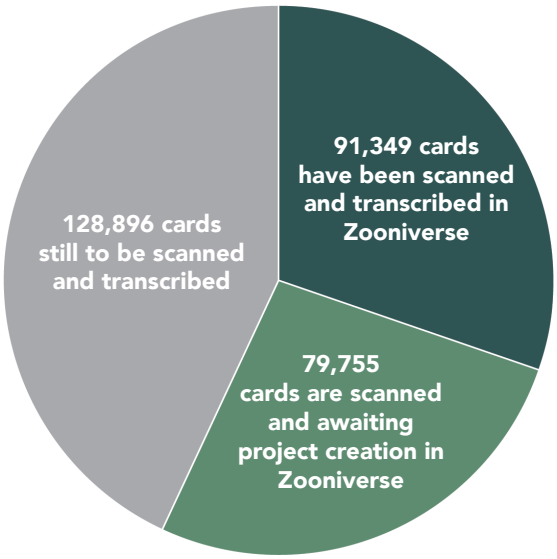
13,152 volunteer hours



That's equivalent to 18 months of effort!

We Need Your Help!

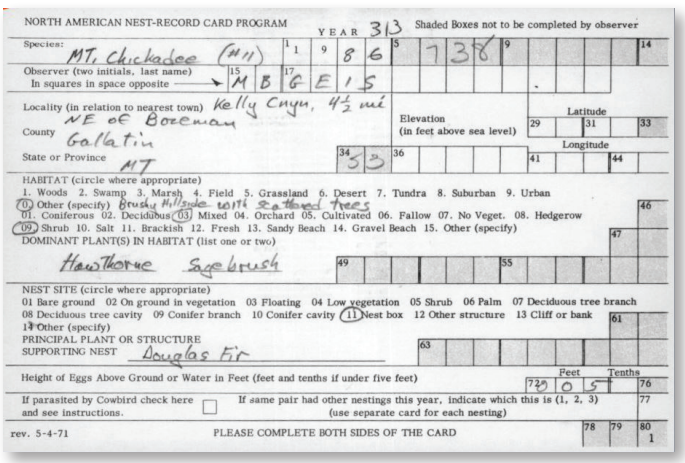
You can help too, by transcribing our scanned cards in Zooniverse (example bottom right). Visit the **Nest Quest Go! project** on Zooniverse or download the Zooniverse app, and start transcribing today!



Help Transcribe Nest Cards

With Gratitude

Before we can add nest-record cards to a project on Zooniverse, the physical cards must be sorted, organized, stamped, and scanned. Special thanks goes to Cornell University students, Lab staff, and volunteers who've been involved in the Nest Quest Go! project in 2020: Beverly Stockard, Deb Fyler, Grace Ogden, Jewel Alston, Joy Pojim, Liz Chartier, Lynn Bertoia, Mary Winston, Nick Thomas, Pamela R. Smith, Rachael Ashdown, Sophia Mathews, and Turner Wilson.


NORTH AMERICAN NEST-RECORD CARD PROGRAM
YEAR 313
Shaded Boxes not to be completed by observer
Species: MT. Chickadee (MH)
Observer (two initials, last name) In squares in space opposite → M B G E I S
Locality (in relation to nearest town) Kelly Cnyn, 4½ mi NE of Bozeman
County Gallatin
State or Province MT
Elevation (in feet above sea level)
Latitude
Longitude
HABITAT (circle where appropriate)
1. Woods 2. Swamp 3. Marsh 4. Field 5. Grassland 6. Desert 7. Tundra 8. Suburban 9. Urban
(0) Other (specify) Brushy Hillside with scattered trees
01. Coniferous 02. Deciduous (03) Mixed 04. Orchard 05. Cultivated 06. Fallow 07. No Veget. 08. Hedgerow
(09) Shrub 10. Salt 11. Brackish 12. Fresh 13. Sandy Beach 14. Gravel Beach 15. Other (specify)
DOMINANT PLANT(S) IN HABITAT (list one or two)
Hawthorne Sagebrush
NEST SITE (circle where appropriate)
01 Bare ground 02 On ground in vegetation 03 Floating 04 Low vegetation 05 Shrub 06 Palm 07 Deciduous tree branch
08 Deciduous tree cavity 09 Conifer branch 10 Conifer cavity (11) Nest box 12 Other structure 13 Cliff or bank
14 Other (specify)
PRINCIPAL PLANT OR STRUCTURE SUPPORTING NEST Douglas Fir
Height of Eggs Above Ground or Water in Feet (feet and tenths if under five feet) Feet 25 Tenths 0 5
If parasited by Cowbird check here and see instructions.
If same pair had other nestings this year, indicate which this is (1, 2, 3) (use separate card for each nesting)
rev. 5-4-71
PLEASE COMPLETE BOTH SIDES OF THE CARD

Participants differ in attitudes and practices towards non-native birds

BY TINA PHILLIPS, ASSISTANT DIRECTOR, CENTER FOR ENGAGEMENT IN SCIENCE AND NATURE

Anyone who has ever spent a season monitoring nest boxes has likely experienced and reveled in the joy of watching the nesting cycle unfold. From the back and forth of courtship and nest building, to the quiet stillness of egg laying and incubation, to the busy and exciting arrival and feeding of nestlings as they grow and fledge from the nest. As many nest monitors will attest to however, there are also other events that are less joyous and require concerted effort and management of nest boxes in order to protect native cavity-nesting birds. This is especially true when dealing with species such as House Sparrows and European Starlings, both non-native species that aggressively compete with native birds such as Eastern Bluebirds and American Kestrels for nesting cavities.

There is widespread recognition that people who monitor nests do manage non-native species through both passive (e.g., restricting hole sizes) and active (e.g., removing nest or eggs) measures. We were interested in understanding what factors are likely to be associated with management actions among nest-box monitors. To better understand the role of nest-box monitors in the management of non-native species, in 2018 the Cornell Lab of Ornithology surveyed monitors in the U.S. and Canada on their past and present management activities. The online survey went out to participants in NestWatch and other monitors that were not NestWatch participants, including members of the North American Bluebird Society (NABS). In addition to understanding management practices, we also were interested in understanding if perceptions of the threat of non-native species, and knowledge and enjoyment of non-natives, differed between the two groups of survey respondents.

European Starling by Gale Ulsamer

We received nearly 1,000 completed pre- and post-surveys encompassing the beginning and end of the 2018 nesting season, with roughly 30% of responses coming from NestWatch participants. In between the two surveys we also emailed information about House Sparrows and European Starlings to some study participants to determine if knowledge about these species influenced management action.

Results from this study showed that NestWatch participants were more likely to have negative views of non-native species, score higher on bird identification tasks, and to manage invasive species than non-participants. Survey respondents, in general, were also more likely to undertake management practices if they believed non-native birds were a continental-wide problem, underscoring the important role of individual factors, such as perception of the threat of invasive species on the monitors' chosen management activities.

These findings suggest that an informed and engaged public can play an important role in reducing

House Sparrow by Micah Grove

the negative effects of non-native species on native cavity-nesting birds. We also argue that protocol-driven citizen science may be a model system for managing non-native species. This is especially true in projects like NestWatch, where individuals are encouraged to visit nests every few days, thereby increasing opportunities for observing key biological events, such as when a nest is taken over or eggs are destroyed by a non-native species. Over time and increased exposure to these kinds of events, participants increase their understanding of the complexity of the natural system, which may result in heightened perceptions of the threat of the problem of non-native species. Thus, the experiential nature of citizen-science projects like NestWatch often influence knowledge and attitudes, which in turn, may affect a nest-box monitor's inclination to manage non-native species. This study also highlighted that as much as nest-box monitors take pleasure in observing the nesting cycle, they also take responsibility in ensuring protection of cavity-nesting birds by managing non-native species.

We wish to thank all of the individuals who responded thoughtfully to this survey. The findings from this study entitled "The role of citizen science in management of invasive avian species: What people think, know, and do" were recently published in the *Journal of Environmental Management*. Note, a subset of data from this same survey was used in a complementary study looking at the biological implications of invasive species management which we described in the previous edition of the *NestWatch Digest* (see Bailey et al. 2020).

Reference: Phillips, T. B., R. L. Bailey, V. Y. Martin, H. A. Faulkner-Grant, and D. N. Bonter. 2021. The role of citizen science in management of invasive avian species: What people think, know, and do. *Journal of Environmental Management* 280(2021): 111709. DOI: **https://doi.org/10.1016/j.jenvman.2020.111709**

Regional Roundup

Highlights from the 2020 season

BY ROBYN BAILEY, PROJECT LEADER

In 2020, participants reported 31,529 nest attempts by 338 species—the most yet! In the pages that follow, you'll find data summaries from the U.S. and Canada. Great job, NestWatchers!

Note that for calculations of nesting success in this report, we only use nests for which the nest fate was reported. We defined nesting success as the percentage of nests fledging at least one young. We only report results for species having a minimum of 10 nests with known outcomes per year. We used only successful nests to estimate average number of fledglings as a measure of productivity; therefore, average number of fledglings may exceed average clutch size in our regional tables. The "change from previous" column indicates how 2020 nesting success was different from the previous 10-year average (2010–2019). This can help you interpret whether 2020 was a "good year" or a "bad year" for a species in your region, but it's not necessarily an indication of a long-term trend. One arrow signifies a change of 5–10%, and two arrows signify a change of more than 10%. No arrow is given for changes less than 5%, and an asterisk (*) indicates insufficient data for a region.

Note that House Sparrows, which are a non-native species in North America, typically have extremely low nesting success across all regions. This reflects the fact that most NestWatchers manage invasive species in their nest boxes and does not reflect a natural nesting success rate (i.e., of unmanaged nests).

Mourning Doves by Julie Ibarra, Mexico

2020 NestWatch Season Totals

31,529 NEST ATTEMPTS
2,959 PARTICIPANTS
338 SPECIES
97,866 EGGS
65,812 FLEDGLINGS

International

We received data for a total of 271 nests of 119 species from 40 countries outside of the United States and Canada in 2020! India submitted a record of 45 nests to NestWatch. After India, the top countries were Spain with 41 nests, Mexico with 35 nests, Indonesia with 16 nests, and Germany with 15 nests reported.

TOP 3 COUNTRIES OUTSIDE OF U.S. AND CANADA*

INDIA SPAIN MEXICO

* Not to Scale

Hawaii

Reports from Hawaii in 2020 included just one nest, built by a Warbling White-eye.

Alaska and Northern Canada

The number of nests reported from Alaska and Northern Canada increased by 31.4% to 92 nests in 2020. We had enough data on Tree Swallows in this region (n = 82) to report that the average clutch size was 6.0 eggs, average fledglings was 4.9, and nesting success rate was 74.1% (down from 95.2% in 2019). The northernmost nest of 2020 was a Boreal Owl nest reported by Jeanette Moore in Alaska, which fledged 5 young.

ALASKA AND NORTHERN CANADA: 92 NESTS

Rank	*Species*	*2020 Total nests reported*
1	Tree Swallow	82
2	Chestnut-backed Chickadee	5
3	Boreal Owl	2
4	American Robin	1
4	Black-capped Chickadee	1
4	Northern Waterthrush	1

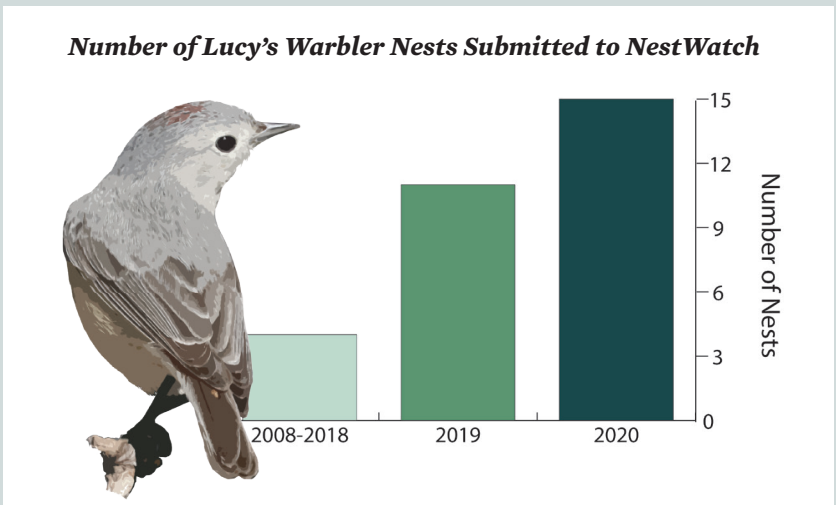
Southwest Region

Tree Swallows were once again the most-reported species in the Southwest. Western and Mountain Bluebirds both experienced high nesting success in 2020, as did Tree Swallows and House Wrens. Violet-green Swallow and Ash-throated Flycatcher were moderately successful with ~75% of nests succeeding. On the other hand, Oak Titmouse nesting success was lower than usual, at 62.5%, which is similar to the open-cup-nesting House Finch (61.9% of nests fledging at least one young).

Lucy's Warbler is a species that did not make the top 10, but nevertheless caught our eye because of its sudden appearance in the dataset. Three years ago, this small cavity-nesting warbler was nearly absent from our database; what's with the sudden increase? Nest boxes! This species is a relative newcomer to nest boxes, and we still have much to learn about how they fare in human-altered environments. You can help by **installing a Lucy's Warbler nest box**. We're excited to see the increased reports.

Violet-green Swallows by Christine Haines

Lucy's Warbler nest box by Olivia Carey



Number of Lucy's Warbler Nests Submitted to NestWatch

Up until 2018, NestWatch had just four records of Lucy's Warbler nests. In 2019 and 2020, submissions increased noticeably.

Lucy's Warbler by Alan Schmierer, CC0

TOP-10 LIST: 3,754 NESTS REPORTED FOR ALL SPECIES

Rank	*Species*	*2020 Total nests reported*	*2020 Average clutch size*	*2020 Average fledglings*	*2020 Average nesting success (%)*	*Previous 10-year average success (%)*	*Change from previous*
1	Tree Swallow	1,065	4.8	4.0	80.0	81.2	
2	Western Bluebird	811	4.9	4.2	81.3	79.0	
3	Mountain Bluebird	671	4.9	4.5	79.9	78.4	
4	House Wren	133	5.7	5.2	82.0	81.4	
5	Violet-green Swallow	130	4.3	3.6	75.4	81.8	↘
6	Red-tailed Hawk	87	*	*	*	77.4	
7	Cooper's Hawk	66	*	*	*	*	
8	Oak Titmouse	57	5.6	5.2	62.5	79.3	↘↘
9	Ash-throated Flycatcher	44	4.2	3.8	75.7	81.7	↘
10	House Finch	39	4.2	3.5	61.9	66.5	

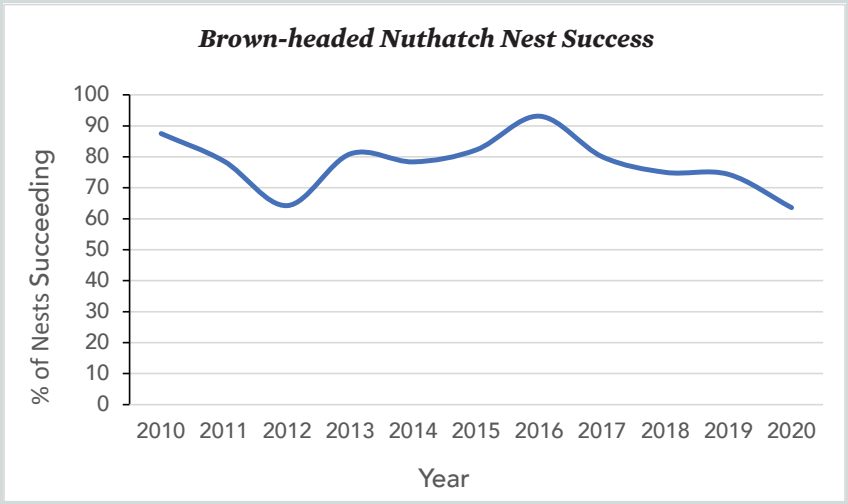
*Insufficient data

Southeast and Gulf Coast Region

In the Southeast and Gulf Coast region, American Robins had a notably good nesting season with nearly 70% of nests fledging at least one young. We also received 1,292 more Eastern Bluebird nests in 2020 than the previous year—a big bump for the region! The Eastern Bluebird experienced a productive year (76.6% of nests succeeding), as did Carolina Wren (78.1%), Bewick's Wren (85.5%), and Black-crested Titmouse (81.7%).

Unfortunately, Wood Duck nesting success was lower than the 10-year average, at 56.4% of nests succeeding. While 2020 represents a dip for the species, there was no consistent downward trend when looking back across the past 10 years.

One southern specialist, the Brown-headed Nuthatch, had a particularly low year in terms of nest success (63.6%). This is a species that is of conservation concern due to its reliance on pine forests. Louisiana and South Carolina show the steepest population declines, with Texas, Alabama, Mississippi, and Florida also showing less severe declines (Breeding Bird Survey 2017). NestWatchers who live in the bird's breeding habitat can **install a nest box** to help support successful nesting.



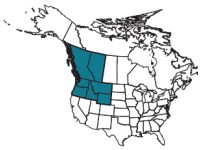
Looking across 11 years of data from this region, we can see that the percentage of Brown-headed Nuthatch nests fledging at least one young was lower in 2020 (63.6%) than in any of the previous 10 years (n = 350 total nests with known outcomes).

MARIE LEHMANN

A Brown-headed Nuthatch visits a nest box.

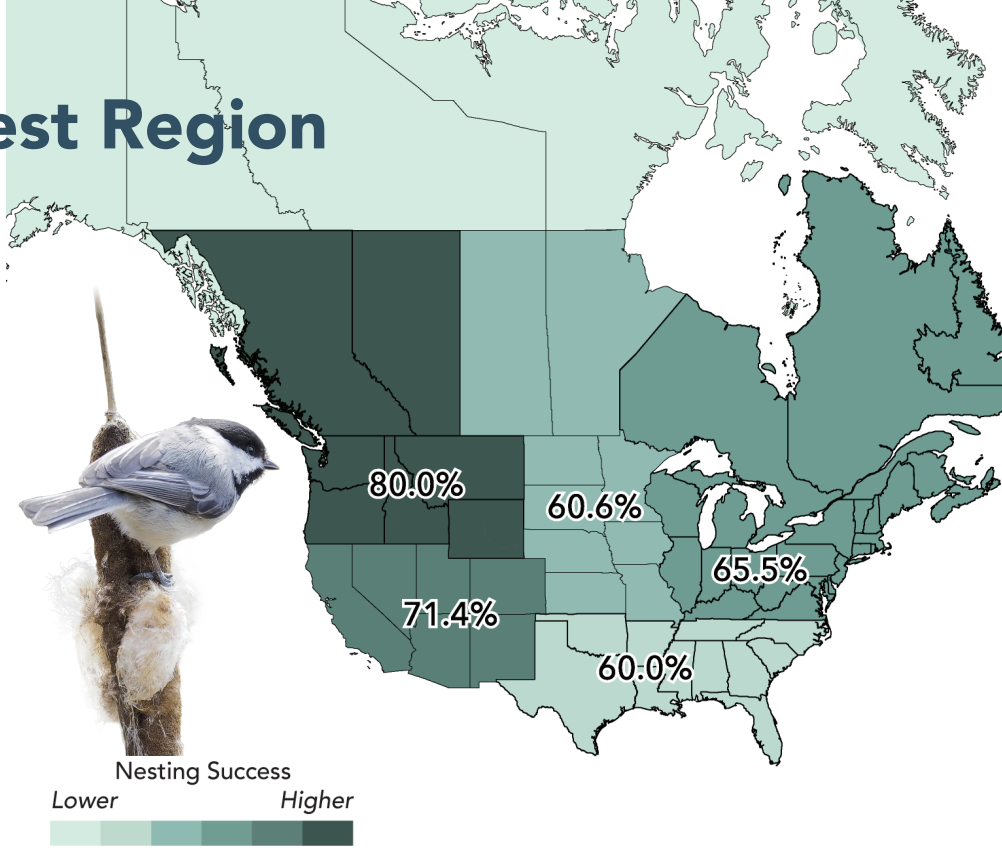
TOP-10 LIST: 7,504 NESTS REPORTED FOR ALL SPECIES

Rank	*Species*	*2020 Total nests reported*	*2020 Average clutch size*	*2020 Average fledglings*	*2020 Average nesting success (%)*	*Previous 10-year average success (%)*	*Change from previous*
1	Eastern Bluebird	4,915	4.4	3.9	76.6	75.9	
2	Carolina Chickadee	505	5.1	4.8	69.9	74.9	▼
3	Carolina Wren	323	4.6	4.3	78.1	78.8	
4	Tree Swallow	236	4.8	4.4	75.7	78.5	
5	Bewick's Wren	225	5.8	4.9	85.5	80.3	▲
6	Black-crested Titmouse	96	5.2	4.6	81.7	84.5	
7	Wood Duck	94	14.1	14.0	56.4	84.0	▼▼
8	House Wren	86	5.0	4.7	75.0	67.2	▲
9	Tufted Titmouse	79	5.4	4.9	72.6	81.0	▼
10	American Robin	77	3.3	2.8	69.7	49.3	▲▲



Northwest Region

This region experienced the most growth in nest submissions with an 89.7% increase over 2019. We also saw a staggering 415% increase in Mountain Bluebird nest submissions (623 more than in 2019), while Western Bluebird nest submissions remained relatively the same. House Wrens and Black-capped Chickadees were especially successful in 2020 (82.8% and 80.0% respectively); in fact, for both species, this was the region with the highest nest success. For Black-capped Chickadees, there was a large 20-percentage-point difference between the most and least successful regions (see map).



Black-capped Chickadee by Alan Troidl

Black-capped Chickadees in the Northwest had the highest percentage of nests succeeding (80.0%) of any region in 2020 (n = 273 nests with known outcomes, all regions combined).

Violet-green Swallows by Christine Haines

Unfortunately, American Robins and Violet-green Swallows in the region experienced a lower-than-average season in terms of nesting success (53.8% and 64.3% respectively; both >20 percentage points lower than the 10-year average). However, for American Robins, many nest fates were not reported, so we could use more data on why robin nests were failing.

TOP-10 LIST: 2,161 NESTS REPORTED FOR ALL SPECIES

Rank	*Species*	*2020 Total nests reported*	*2020 Average clutch size*	*2020 Average fledglings*	*2020 Average nesting success (%)*	*Previous 10-year average success (%)*	*Change from previous*
1	Tree Swallow	860	5.5	4.9	68.5	76.4	↓
2	Mountain Bluebird	623	5.2	4.8	77.7	75.9	
3	Western Bluebird	181	5.4	4.2	66.0	70.2	
4	House Wren	150	6.4	6.0	82.8	81.6	
5	Black-capped Chickadee	40	6.3	4.8	80.0	81.3	
6	American Robin	32	*	*	53.8	77.6	↓↓
6	Dark-eyed Junco	32	4.1	2.7	52.6	*	
7	House Sparrow	28	*	*	5.0	14.7	↓
8	Barn Swallow	26	*	*	*	*	
9	Violet-green Swallow	20	4.5	*	64.3	85.5	↓↓

*Insufficient data

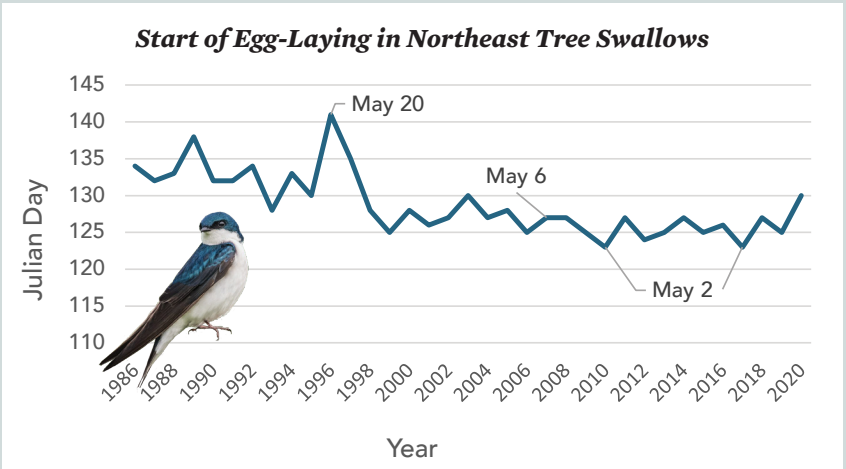
Northeast Region

Black-capped Chickadees by Joyce Commercon

NestWatchers in the Northeast reported on 16,296 nests, with the top 3 species once again being Eastern Bluebirds, Tree Swallows, and House Wrens. Most of the Top 10 species were fairly close to their 10-year average in terms of nest success; however, American Robin, Carolina Chickadee, and American Kestrel showed slightly lower nesting success than their 10-year average (between 8-10 percentage points lower).

In 2020, we were able to bulk upload 7,927 Tree Swallow nests from a 35-year study in the region. This long-term dataset represents a treasure trove of historical information. Tree Swallows belong to the guild of "aerial insectivores" (i.e., flying insect-eaters) which are generally declining in North America. Because their nesting is tied to insect availability, which may itself be changing due to climate change, this species is vulnerable to temperature and precipitation changes in early spring. The graph below shows that the start of egg-laying is highly variable by year, but may be generally trending towards earlier nesting.

Tree Swallows by Bill VanderMolen

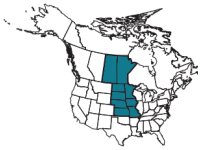


Tree Swallows in the Northeast initiated clutches about 4 days sooner in 2020 than in 1986 (n = 49,724 nests with known egg-laying dates). For this graph, we used the 10th percentile of first-egg-date for each year to define the "start of the breeding season"; this avoids extreme outliers which may not be representative of the season's onset.

Tree Swallow by Laura Frazier

TOP-10 LIST: 16,296 NESTS REPORTED FOR ALL SPECIES

Rank	*Species*	*2020 Total nests reported*	*2020 Average clutch size*	*2020 Average fledglings*	*2020 Average nesting success (%)*	*Previous 10-year average success (%)*	*Change from previous*
1	Eastern Bluebird	5,234	4.3	3.8	75.1	77.1	
2	Tree Swallow	4,058	5.0	4.5	80.6	75.7	
3	House Wren	2,037	5.4	4.9	78.7	76.0	
4	House Sparrow	1,202	3.6	3.6	4.8	5.0	
5	Purple Martin	641	4.8	4.4	87.1	83.4	
6	American Robin	532	3.3	2.9	55.6	63.6	↘
7	Black-capped Chickadee	298	5.8	5.3	65.5	67.4	
8	Carolina Chickadee	215	5.5	4.8	54.7	63.3	↘
9	American Kestrel	197	4.7	4.2	71.7	81.6	↘
10	Carolina Wren	191	4.3	3.8	77.9	75.9	

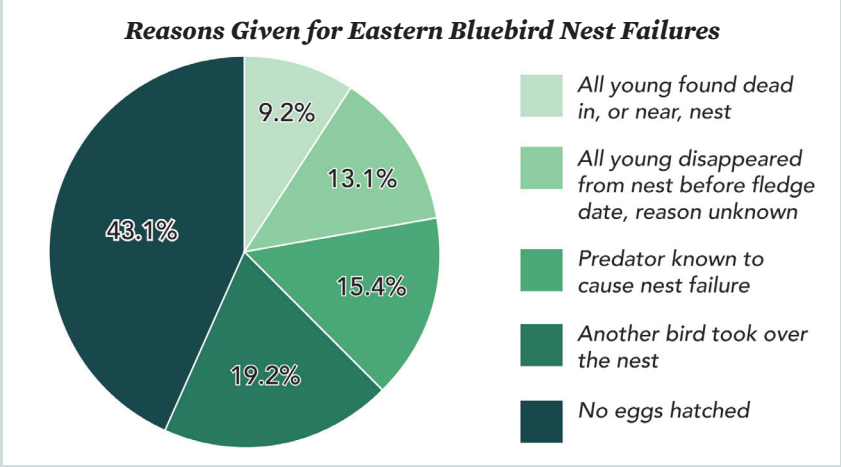


Central Region

Purple Martin eggs by Theresa Zmola

Purple Martins had another excellent year in the Central region, with 97.6% of nests fledging at least one young. This was well ahead of the pack, and about 6 percentage points above the 10-year average. Tree Swallows were moderately successful with 77.5% of nests fledging young; 2020 was a typical year for the species.

Unfortunately, 4 species' nesting success fell well below their 10-year average indicating a less successful season: Eastern Bluebirds, American Robins, Wood Ducks, and Barn Swallows. Of these, Eastern Bluebirds had the most reports, so we were able to delve into the reasons for nest failure as reported by NestWatchers. The biggest source of nest failure was the eggs failing to hatch (43.1%), followed by usurpation of the nest by another bird (19.2%; see graph, right). Eggs can fail to hatch for a variety of reasons, the most common of which include extreme weather, nest abandonment, death of the female, or infertility.



NestWatchers reported 130 failed Eastern Bluebird nests in the Central region in 2020. The predominant cause was eggs failing to hatch. These percentages reflect only the causes of nest failure, not the overall proportions of nest fates (see table below for results which also include successful outcomes).

TOP-10 LIST: 1,450 NESTS REPORTED FOR ALL SPECIES

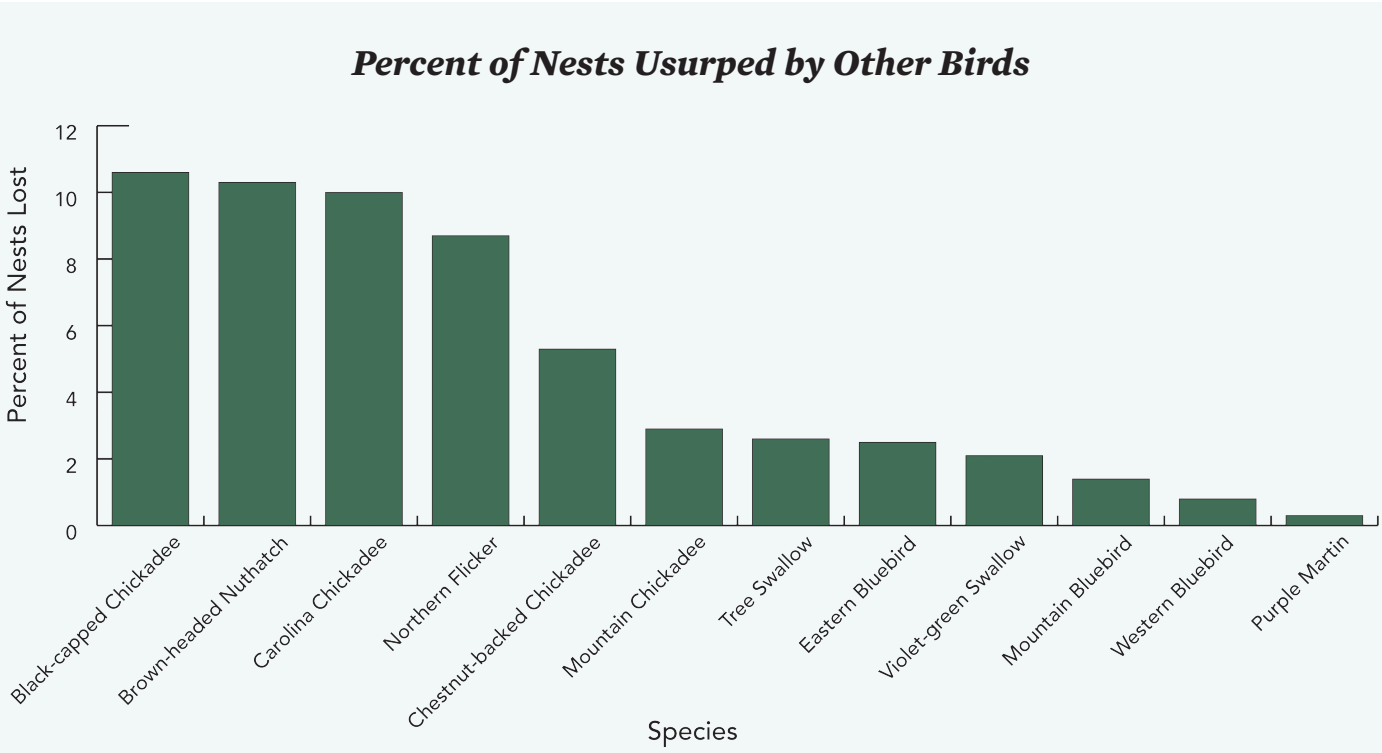
Rank	*Species*	*2020 Total nests reported*	*2020 Average clutch size*	*2020 Average fledglings*	*2020 Average nesting success (%)*	*Previous 10-year average success (%)*	*Change from previous*
1	Eastern Bluebird	550	4.3	4.2	66.8	77.9	⮟⮟
2	Tree Swallow	316	5.6	5.1	77.5	78.3	
3	House Wren	117	5.7	5.3	67.1	74.5	⮟
4	American Robin	83	3.3	2.8	59.1	73.9	⮟⮟
5	Purple Martin	45	5.5	5.0	97.6	91.7	⮝
6	Black-capped Chickadee	44	5.4	4.6	60.6	69.1	⮟
7	Mourning Dove	28	1.8	1.7	55.6	*	
7	Wood Duck	28	11.1	9.2	75.0	89.4	⮟⮟
8	Red-winged Blackbird	27	*	*	*	*	
9	Barn Swallow	23	4.4	3.9	68.4	82.7	⮟⮟

*Insufficient data

NestWatch pioneers a new way to study nest competition

BY ROBYN BAILEY, PROJECT LEADER

Based on research that we published in 2020 concerning the failure of nests due to another bird taking over (Bailey et al. 2020), NestWatch added a new outcome code in 2020. The outcome code allows nest monitors to tell us when a nest has failed due to another bird taking over, and which species usurped the nest. In our first year of having this outcome code available, we documented 665 nests that were usurped by both invasive species and other native species. In the figure below, you'll see a dozen common nest box species ranked in order of how frequently they lost nests to usurpation.



The percentage of nests lost due to "another bird taking over the nest" is shown for 12 common nest box species. In this analysis, we required at least 20 nests with an outcome response in order to be included. [Not all species are shown due to space constraints.]

Right away, we notice that 4 of the 12 species are chickadees, small-bodied birds that might be utilizing nest boxes intended for larger species. Bigger birds can be more dominant and may have competitive advantages over smaller birds. Brown-headed Nuthatches are another small bird that lost big. Despite being cooperative breeders that band together to defend their nests, they nevertheless lost about 10% of their nests to other birds. One solution to help smaller birds might be to provide some nest boxes with 1 1/8" entrance holes, or you can retrofit a nest box with an entrance hole reducer once a nest has been established. **Read our blog post here** for further details on pairing nest boxes to promote small bird success.

Contrary to our 2020 research in which we surveyed nest box monitors about their nest box takeovers, we saw that bluebirds and Tree Swallows came in well below 10% expected usurpations. Nest losses to usurpation were higher for swallows (Tree Swallow: 2.6%; Violet-green Swallow: 2.1%) and Eastern Bluebirds (2.5%) than for blue-

birds out west (Western Bluebirds: 0.8%; Mountain Bluebirds: 1.4%). Purple Martins were also not usurped as often as our survey research would suggest (at 0.3%). A few reasons for the differences might be hypothesized. We invited people who do not normally participate in NestWatch to take the survey, and they may differ from NestWatchers in meaningful ways (e.g., habitat conditions, number of nest boxes provided, invasive species tolerance or deterrence). Also, the survey research only quantified nest usurpation by invasive species, whereas the new NestWatch outcome code update can quantify usurpation by any species, native or non-native (see below). According to the NestWatch data, invasive species were rarely the most common usurper, but House Sparrows and European Starlings were still involved in taking over 82 nests of 11 different species.

This work is still in its early stages, and has not been widely studied at the continental scale. We hope to be able to conduct a multi-year study using this new data stream in the future; with it, we can investigate the impacts of competition by invasive species, conspecifics (same species), and heterospecifics (different species). These data represent a preliminary look at who the "losing" species might be in the competitive world of nesting. It's important to remember that this source of nest failure was relatively small compared to other sources of nest failure across most species (compared to predators, hatching failure, etc.); however, it was the largest source of nest failure for both the Carolina and Black-capped Chickadee.

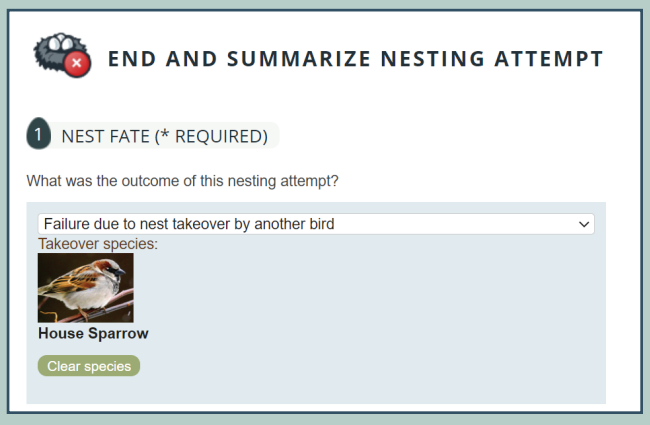
Reference:
Bailey R. L., H. A. Faulkner-Grant, V. Y. Martin, T. B. Phillips, and D. N. Bonter. 2020. Nest usurpation by non-native birds and the role of people in nest box management. *Conservation Science and Practice 2020:* e185. DOI: **https://doi.org/10.1111/csp2.185**

Prothonotary Warbler by Paul DuBowy

Was your nest usurped?

There are several kinds of nest usurpation events; it's not just the invasive species taking over! All of these situations are eligible to be reported as a usurpation outcome:

- **Intraspecific**: One species taking over the nest of another member of the same species.
- **Interspecific**: Any species taking over the nest of any other species.
- **Interspecific - invasive**: European Starlings or House Sparrows taking over a native bird's nest.



HINT Use "**Failure due to nest takeover by another bird**" (see above, right) as the outcome for any nest that was taken over by another bird. Use "**Invasive species management**" as the outcome when reporting the outcome of a House Sparrow or European Starling nest that you have managed.

Occupation of nest boxes in central Veracruz Mexico

BY DIANA JUANZ-AGUIRRE AND ALBERTO HERNÁNDEZ-LOZANO, INSTITUTE OF BIOLOGICAL RESEARCH, UNIVERSIDAD VERACRUZANA, XALAPA, VERACRUZ, MEXICO

In Mexico, particularly in the state of Veracruz, more than 80% of the vegetation has been transformed. The destruction of habitat due to anthropic activities is the main threat to Neotropical birds, causing, among other effects, the reduction of nesting sites. The installation of nest boxes is a management technique that helps complement the natural supply of cavities, offering a nesting alternative for birds that require cavities.

Following the indications and suggestions of the guide ***Thinking Outside the (Nest) Box***, an educational resource of the Cornell Lab of Ornithology, 80 artificial nests were built and installed for resident birds in environments with different degrees of disturbance within the Private Conservation Area "Xocotitla," located in the center of Veracruz, Mexico. Until 2000, the site was a ranch that produced livestock and papayas; it is now a nature reserve and vegetation is regenerating. During the 2020 and 2021 nesting seasons, we intend to assess the occupation of nest boxes, the diversity of resident birds that occupy artificial nests, and the habitat near the nest boxes.

In the 2020 breeding season (March–July), eight occupied nest boxes were registered, starting with one nest in May, then June being the most abundant month (five), and ending with two in July. Six were found in an environment with a degree of disturbance and two in preserved environments. We documented 28 eggs in total and 23 hatchlings; one of the nests was abandoned. The species that occupied these artificial nests were the Rufous-naped Wren (*Campylorhynchus rufinucha*), Golden-fronted Woodpecker (*Melanerpes aurifrons*), Black-crested Titmouse (*Baeolophus atricristatus*) and Brown-crested Flycatcher (*Myiarchus tyrannulus*). Height and geographical orientation of the nest boxes was considered along with the habitat to determine the probability of nest box occupation. In 2021, we expect to continue monitoring and compare the occupation of artificial nests in both reproductive seasons.

Alberto Hernández-Lozano

Diana Juanz-Aguirre

Diana Juanz-Aguirre

Brown-crested Flycatcher nestlings (above) and eggs (right).
Polluelos (arriba) y las huevos (a la derecha) de Tirano copetón.

Ocupación de cajas nido en el centro de Veracruz, México

POR DIANA JUANZ-AGUIRRE Y ALBERTO HERNÁNDEZ-LOZANO, INSTITUTO DE INVESTIGACIONES BIOLÓGICAS, UNIVERSIDAD VERACRUZANA, XALAPA, VERACRUZ, MÉXICO

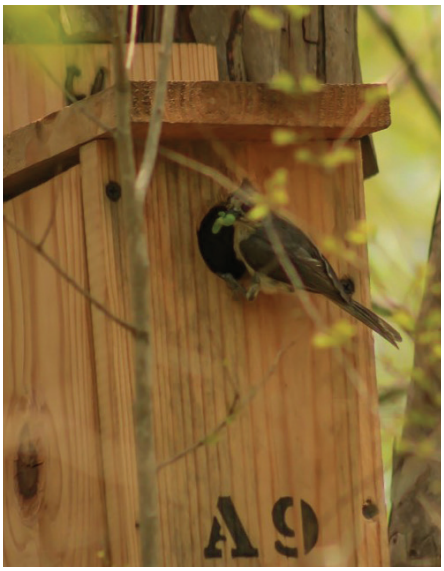
En México, particularmente en el estado de Veracruz, más del 80% de la vegetación ha sido transformada. La destrucción del hábitat por actividades antrópicas es la principal amenaza para las aves neotropicales, provocando entre otras afectaciones, la disminución de los sitios de anidación. La instalación de cajas nido es una técnica de manejo que contribuye a complementar la oferta natural de oquedades, ofreciendo una alternativa de anidación para aves que requieren cavidades.

Alberto Hernández-Lozano

Diana stands next to all of the nest boxes installed at Xocotitla.
Diana se para unto a todas las cajas nido instaladas en el Xocotitla

Siguiendo las indicaciones y sugerencias de la guía ***Pensando Fuera de la Caja (de nido)***, recurso educativo del laboratorio de ornitología de la Universidad de Cornell, se fabricaron e instalaron 80 nidos artificiales para aves residentes en ambientes con distinto grado de perturbación dentro del Área Privada de Conservación "Xocotitla," ubicada en el centro de Veracruz, México. Hasta el año 2000, el sitio era un rancho que producía ganado y papayas; ahora es una reserva natural y la vegetación se está regenerando. Se pretende evaluar la ocupación de cajas nido realizando monitoreos durante la temporada reproductiva 2020 y 2021, registrar la diversidad de aves residentes que ocupan nidos artificiales y caracterizar el hábitat cercano a las cajas nido.

En la temporada reproductiva (marzo-julio) 2020, se registraron ocho cajas nido ocupadas, a partir del mes de mayo (1), posteriormente junio (5) siendo el mes más abundante y julio (2), de las cuales seis se encuentran en un ambiente con grado de perturbación y dos en ambientes conservados. Se documentaron 28 huevos en total y 23 crías eclosionadas, uno de los nidos fue abandonado. Las especies que ocuparon estos nidos artificiales fueron la Matraca nuca canela (*Campylorhynchus rufinucha*), Carpintero frente dorada (*Melanerpes aurifrons*), Carbonero cresta negra (*Baeolophus atricristatus*) y Tirano copetón (*Myiarchus tyrannulus*). Se considera la altura, orientación geográfica de las cajas nido y el hábitat para determinar la probabilidad de ocupación de las cajas nido. Se espera la siguiente temporada reproductiva para realizar el monitoreo correspondiente y comparar la ocupación de nidos artificiales en ambas temporadas reproductivas.



Diana Juanz-Aguirre

Black-crested Titmouse at the nest box.
Carbonero cresta negra a la caja de nido.

Anthropogenic light and noise pollution affect nesting birds

BY ROBYN BAILEY, NESTWATCH PROJECT LEADER

An international team of researchers has just completed one of the world's most comprehensive studies on the effects of noise and light pollution on nesting birds. The new study, published in the scientific journal *Nature*, utilizes 58,506 nest records from 142 species spanning 14 years. These data, which were collected by NestWatch participants, were combined with continental-scale data on noise and light pollution to elucidate impacts on the timing of nesting, nesting success, clutch size, and hatching failure.

As you might expect, noise and light pollution commonly coincide in built environments. Teasing apart their separate effects required data from all across the rural to urban gradient, from quiet to noisy, from dark to lit. Gathering the vast data necessary for such a study could only be accomplished by the use of volunteer nest monitors. "It required having many eyes and ears and these nest monitors collecting data where they lived," said study co-author Caren Cooper of North Carolina State University. Data on ambient conditions were largely gathered remotely, via either satellite (light pollution) or long-term acoustic monitoring and modeling (noise pollution).

Each species varied in their responses to excess light based on whether their nesting habitat was more open (think wetlands, fields, and farms) or closed (as in forests), and how sensitive their eyes are to light levels. For example, birds that nest in open habitats located in the brightest-lit areas began laying eggs an average of one month earlier than those in darker areas. Forest birds also advanced their lay dates by about 18 days, and their clutch sizes were 16% larger in well-lit compared to darker areas. Birds with higher sensitivity to light and those that nest in cavities (dark tree holes and nest boxes) were more likely to advance their laying dates when exposed to more light as well. This makes sense when you consider that birds are highly attuned to day length as a cue for when to start breeding.

KIM HARLOW

A Mourning Dove sits on her nest at night, photographed using an infrared camera.

Somewhat surprisingly, species adapted for low-light conditions experienced an improvement in nest success when exposed to more light. Perhaps these species were able to take advantage of light to hunt for food more effectively. However, it's important to keep in mind that what is positive for one species could be negative for another. For example, Western Bluebirds experienced a negative influence of light on nesting success.

When it comes to excess noise, forest-nesting birds had reduced clutch sizes, a higher likelihood of clutch failure, and decreased nest success in the noisiest areas as compared to the quietest areas. Birds nesting in open habitats did not experience these same negative impacts on reproduction. One proposed reason for this difference is that birds nesting in forests tend to sing at lower pitches, which could mean that a pair's communication is affected when they have to compete with low-frequency human noise. This is supported by evidence from the study which demonstrates that noise pollution delayed the onset of nesting for birds with lower-frequency songs.

One of the key findings of the study is that things are complicated. With so many species and such spa-

tial variation, they found both advances and delays in the timing of nesting, increases and decreases in clutch size, improvements and declines in nesting success—all depending on which habitat, lighting, and noise exposure conditions a bird might experience. To further complicate things, it is also well-documented that climate change is advancing the nesting season for many species. The study authors caution that ignoring the impacts of light and noise pollution could oversimplify conclusions drawn about climate change. For instance, if birds are only studied in urban areas or only in pristine habitats, you could draw conclusions that may not necessarily reflect bird health across the wide spectrum of sensory and climate stressors.

Study co-author Clinton Francis thinks that this could be a first step towards developing a "sensory pollution sensitivity index" for North American birds which could be used to inform conservation plans for declining species. The ubiquity of light and noise pollution is only increasing, and studies of animal health have lagged behind those of human health consequences. Francis expressed deep gratitude to the volunteer observers, saying: "Obtaining high quality nesting data is very time consuming, and it is amazing we were able to do this study with more than 58,000 nests. It certainly would not have been possible without the participants who carefully monitored all of the nests and submitted their observations to NestWatch."

Reference: Senzaki, M., J. R. Barber, J. N. Phillips, N. H. Carter, C. B. Cooper, M. A. Ditmer, K. M. Fristrup, C. J. W. McClure, D. J. Mennitt, L. P. Tyrrell, J. Vukomanovic, A. A. Wilson, and C. D. Francis. 2020. Sensory pollutants alter bird phenology and fitness across a continent. *Nature* (2020). DOI: **https://doi.org/10.1038/s41586-020-2903-7**

Karl Krause

Connect with us digitally!

Unlike these two Lesser Nighthawk chicks (above), we're not hard to find. Follow NestWatch on Facebook and Twitter for the latest updates, sign up for our monthly eNewsletter, and check out our blog.

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