



Bluebird

Fall 2005
Vol. 27, No. 4



Our cover photo of an Eastern Bluebird being held as it is banded comes to us from the Hilton Pond Center in South Carolina, courtesy of director Bill Hilton Jr. We also have a photo taken during their banding activities that shows clearly the brood patch on the stomach of a female bluebird. To learn more about brood patches, turn to page 15.

Nest boxes get warm. Researchers in Oregon rested four ways to keep boxes cool, important for eggs and hatchlings. Read about their findings on page 8.

Hundreds of migrating bluebirds, flocks of them coming through an Iowa town. This was in 1917, and the story offers a small look at what used to be. See page 14.

Research Reviews on page 16 discuss bluebird eyesight, the timing of egg laying, and food brought to hatchlings.

Tree-s snag research, with focus on urban areas, is reported on pages 18 and 19.

We have a special holiday for gift or renewal memberships in NABS. Find the details on page 21.

The NABS 2006 convention will be in Texas. All the information you need to plan your trip to this very special event is in our centerfold pullout section.



North American Bluebird Society

The North American Bluebird Society is a non-profit conservation, education, and research organization that promotes the recovery of bluebirds and other native cavity-nesting bird species.

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From the President

By Steve Garr

As I write this letter to you, NABS is in the process of making major changes. In fact, by the time you receive this issue of *Bluebird*, NABS will have a new executive director and a new home. I am pleased to announce the NABS Executive Committee, with the approval of the board of directors, has hired Gary Springer as our new director. Gary has taken many of the duties and responsibilities of the director since this position was left vacant in April.

The most immediate difference will be having someone in the NABS office every workday to answer phone or email questions from members, and to promote bluebirds. Too often, people do not realize that it is not just NABS members who benefit from our organization. Many of the phone calls and emails come from nonmembers. NABS has always led the bluebird conservation effort by helping anyone interested in learning about bluebirds.

With the new executive director also comes a change in location for the NABS office, from Ohio to Georgia. NABS will now have its own building and space to expand. Plans are being made to give us the capability to maintain a NABS museum, gift shop, conference center and office along with an active bluebird trail at our new location. Besides information about NABS, the headquarters will have a display of NABS-approved nest boxes.

The new location is in northeast Georgia on Highway 106 between Athens and Carnesville. Look for more informa-

tion and photos in the next issue of *Bluebird*.

And now, about that warm welcome NABS members received in Ashville from the North Carolina Bluebird Society. I want to thank Helen Munro and all the volunteers who made NABS 2005

such a success. If you weren't there you missed wonderful seminars and breathtaking views.

Each year the NABS conventions take me to some of the best places North America has to offer. I look forward to the next convention, NABS 2006 in Texas, knowing that they have been working nonstop to get everything organized.

I want to remind everyone planning to attend the convention that the best way to support the convention is to stay at the host hotel. NABS 2006 has secured special rates on the rooms. The more rooms NABS members reserve the better discount the convention receives on the banquet rooms.

Please see the insert in this issue to find NABS 2006 convention registration information.

As always, I want to thank all of our NABS members for being a part of this organization. I have said often that the membership is the lifeblood of any organization, and your membership is greatly appreciated. Please remember to pass along to others the joy of contributing by encouraging them to join NABS, or simply buy someone you know a gift membership.

Changes at NABS

Nominations sought for 2006 NABS awards

The North American Bluebird Society annually makes awards for outstanding contributions to bluebird conservation. Awards will be presented at the NABS convention in April in Texas; nominations must be received no later than March 1, 2006.

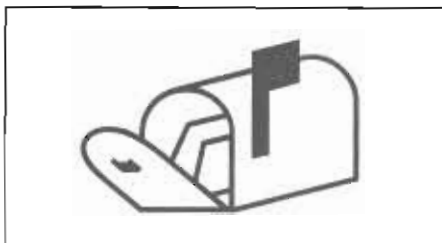
If you wish to nominate an individual, a group, or someone involved in research for an award, please contact NABS board member David Cook at 664 S. 14th St., San Jose, CA 95112, e-mail justdave50@earthlink.net, or by telephone at 408/275-1492. Include your telephone number or e-mail address, please.

For individual awards, consider the ways in which the nominee has publicized or aided bluebird/cavity-nester conservation. Examples might include speaking before groups; working with young people; obtaining publicity in newspapers, radio, or television; working at nature centers, workshops, or fairs; inventing or improving trap or box designs; designing and producing publications; plantings, etc.

For nomination of a group, consider workshops offered, number of boxes maintained by group members, increase in bluebird production, methods of recruiting monitors, successful fledglings, etc. Programs

must have been in place for a minimum of five years.

For research awards, briefly summarize research completed (and in progress) involving bluebirds/cavity nesters, and include bibliographic citations of articles published about bluebirds or other North American cavity nesters (copies of articles or abstracts are desirable).



To the editor,

I have had a bluebird trail on the country club of Wilbraham, Massachusetts, for five years. The first two years I had problems in mid-July because of the chemicals used on the course. There was no irrigation system.

Three years ago, nine more holes were added as well as irrigation, and my problems stopped. Irrigation is important to dissolve the chemical particles spread on the golf course.

This year I have 50 nesting boxes with eight nesting pairs of bluebirds, and will fledge over 70 young, along with 90 Tree Swallows and 40 Black-capped Chickadees.

Our superintendent is cooperative and supports my program with plenty of water as needed.

I'm 84 years old. What a way to spend my last days on this earth. There have to be bluebirds in heaven!

PS: We are on the continental trail.

— *Kenneth E. Johnson, Wilbraham, Massachusetts*



Bluebird

Published by
The North American
Bluebird Society

P.O. Box 244
Wilmot, OH 44689

330-359-5511

Questions should be directed to the NABS headquarters address/telephone number shown above.

The NABS web site offers answers to many questions.

Go to www.nabluebirdsociety.org

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Bluebird/Sialia (ISSN 0890-7021) is published quarterly by the North American Bluebird Society, P.O. Box 244, Wilmot, Ohio 44689. Subscription price is included in annual membership dues. Single copies: \$5. Write for information about bulk quantities. Checks and money orders are made payable to North American Bluebird Society, in U.S. funds. Issues are dated Winter, Spring, Summer, and Autumn and appear approximately on the fifteenth of January, April, July, and October. Deadline for submission of material is three months prior to date of publication.

Letters to the editor and articles in this magazine express the opinions and positions of the authors. Letters may be edited for length and content. Articles published do not necessarily represent the opinions and positions of the officers, directors, or employees of the North American Bluebird Society.

For advertising information, contact the editor of the magazine.

'Red, White & Bluebirds'

NABS 2006 — San Antonio, Texas

By Mary Leyendecker

The NABS convention is a yearly event where bluebirders gather to share information, learn of new developments in bluebirding, enjoy programs and field trips, make friends and renew friendships.

The Texas Bluebird Society (TBS) will host the North American Bluebird Society's 29th Annual Convention in San Antonio, Texas, April 26-30, 2006.

Headquarters hotel is the Airport Hilton, easily accessible from San Antonio International Airport, and featuring a stunning "Texas" décor.

"Your Texas affiliate is working hard to plan a convention with your needs in mind," said Pauline Tom, TBS president.

Continental Airlines and the Airport Hilton are offering group rates for attendees. As NABS 2006 will be hosted during the city's hugely popular Fiesta, attendees are urged to book with the Hilton by Nov. 1 to secure the lowest room rate (\$89 plus 16.75% tax). The hotel will offer the special NABS rate three days before and after the convention.

The registration cost of only \$37 (\$45 for non-members) includes two to five days of activities. The one-day rate is \$25.

The Texas Bluebird Society offers an "Early Bird Gift Package" for those who register before Nov. 1. Upon check-in, each "Early Bird" will receive 37 complimentary prize-drawing coupons and a convention t-shirt. The first 370 registrants will receive

in the mail an Alamo potholder. Every 37th "Early Bird" registrant will receive a ceramic Alamo bank.

A convention brochure insert in this edition of Bluebird outlines registration details, describes each day's agenda, and provides a mail-in registration form. NABS 2006 Convention offers on-line registration at www.NABS2006.com.

"Red, White & Bluebirds", the convention theme, hints at the Texas-style welcome awaiting all for fun, training, education and sharing. April is the best birdwatching period in Texas.

"Diverse and engaging field trips and breakout sessions have each day filled to

the brim," Ms. Tom said. "Those preferring to see the city can join bus tours to the Alamo and various Fiesta hot spots. Thursday afternoon's Tea with Texas Authors will include book signings by June Osborne, Keir Kridler and Mark Klym, and others.

"Friday night guests can ride a river barge and feed a Texas Longhorn snacks during the Big 'Ol Barbecue at Rio Cibolo Ranch. Our TexMex ¡Bluebilación! on Saturday night at the Hilton will spotlight NABS' awards and bat expert Dr. Gary McCracken. Fine art, Texas wines, nest boxes, and other enticing auction items will benefit bluebird conservation.



The lobby of the NABS convention hotel, the Airport Hilton in San Antonio, Texas



The Airport Hilton in San Antonio, overlooking the outdoor swimming pool.

NABS board reunion set for Texas

Imagine many persons who helped the bluebird fight for survival through the years standing together side by side, together for a reunion. This will happen at the NABS 2006 Convention when a Grand Reunion Dinner will take place.

The Thursday evening event is open to all current and former board members registered for the convention.

The dinner will celebrate the 30th anniversary of the publishing of Lawrence Zeleny's book "The Bluebird: How You Can Help Its Fight For Survival". Dr. Zeleny was founder of the North American Bluebird Society.

If you served as a NABS board member, please select the dinner option (\$19 ea.) on the NABS convention registration form.

The Texas Bluebird Society, host of the NABS 2006 Convention (April 26-30, San Antonio Airport Hilton), encourages early registration and hotel room reservations, using the convention registration booklet included with this issue or through on-line registration at www.NABS2006.com.

Many rooms at the hotel were reserved before registration opened on Sept. 1. The convention could sell out by the end of October.

NABS 2005 thank you

Thank you to:

- A. NABS, for the reason to gather bluebird enthusiasts from all over the continent.
- B. The sponsors who helped to defray the expenses.
- C. The participants who enjoyed the ambiance of Asheville, North Carolina, where the altitude enhances the attitude.
- D. The SunSpree Resort for great accommodations and food.
- E. All the speakers who shared their knowledge and expertise.

F. U.S. postal service for applying the NABS 2005 cancellation imprint.

G. All the North Carolina Bluebird Society members who worked to pull all the details together into another successful NABS convention.

— *Sincerely, NABS 2005 co-chairs Bill Abbey, Chuck Bliss and Helen Munro*

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“Feeding live insects to the wild birds in my yard has helped me build a special bond with individual birds.”

– Julie Zickefoose

Remember NABS' mealworm deal; mealworms are a good source of nutrients for birds

By Pauline Tom

Bluebirds (and many other cavity-nesting bird species) love mealworms. The worms are a good source of protein and fat, valuable particularly when the birds cannot easily find adequate nourishment (think winter or early spring) or when the birds are feeding young.

If mealworms are on your bird-feeding menu, remember that NABS members receive a 15 percent discount on mealworms from The Nature's Way (800/318.2611) and Sunshine Mealworms (800/322.1100.)

Now that you have the worms, how do you keep them alive and tasty until they are served to the birds? Here is helpful information from bluebirder Larry Broadbent of Chatham, Ontario. Mr. Broadbent is a member of NABS and of the Ontario Eastern Bluebird Society.

To begin with, Mr. Broadbent stores his worms in his refrigerator. His suggestions continue:

The best method I have come across, and

use myself, is to keep my mealworms in a one-gallon Rubbermaid-type container, in a good thick bed of 100 percent cornmeal. You can easily put 5,000 to 6,000 mealworms in a container this size.

The container lid should have a minimum of four one-half-inch holes for ventilation. On the bottom side of the container lid I fasten two small dampened sponges to keep the interior environment moist.

When you need mealworms to feed your birds, just load a flour sifter with a couple of scoops from the container and sift. The cornmeal will be sifted out, leaving the worms behind.

You do not have to add carrots, potatoes, or other moist food to the cornmeal to provide moisture for the mealworms. The worms will go dormant in the refrigerator, and will not eat. The necessary humidity is provided by the damp sponges.

It is important to take your container(s) of mealworms out of the refrigerator once every week or two, leaving them at room temperature for a day. This allows the mealworms to become active and eat.

Cavity-nesting species most in need of conservation attention

This is a list of North American cavity-nesting bird species designated as of Continental Importance by Partners in Flight (PIF). All are on what PIF calls the Watch List, meaning these species are most in need of conservation attention.

Species for which there are multiple causes for concern across their entire range:

- Red-cockaded Woodpecker
- Ivory-billed Woodpecker

Species moderately abundant or widespread with a declines or high threats:

- Red-headed Woodpecker
- Oak Titmouse
- Brown-headed Nuthatch
- Protonotary Warbler

Species with restricted distribution or low population size:

- Flammulated Owl
- Spotted Owl
- Lewis's Woodpecker
- Nuttall's Woodpecker
- Arizona Woodpecker
- White-headed Woodpecker

Additional stewardship species, those with a high percentage of the global population in a single biome (during breeding season or winter):

- Red-bellied Woodpecker
- Williamson's Sapsucker
- Yellow-bellied Sapsucker
- Red-naped Sapsucker

The mealworm poem

The mealworm is a tasty worm.

I like it.

It has a glabrous epiderm.

I like it.

I peck it 'til it's good and dead,

And pulp it up and smash its head,

Then feed my chicks and go to bed.

I like it.

— Bruce Burdett, Poet Laureate of Sunapee, New Hampshire (or at least of Upper Bay Road)

Cool chicks!

A nest-box temperature study

By Patrick Gallagher
and Dana Gardener

In the Salem Audubon Western Bluebird program, our landowners are well aware of the problems of high temperatures. As they monitor their boxes, it is not unusual to find dead chicks or eggs after hot weather. Temperature is especially critical for bluebirds and swallows (either Violet-Green or Tree) as they have a strong preference for nest boxes in full sun.

In an attempt to minimize heat gain, landowner Diana Gatdenet and I designed a 2004 field study of four kinds of box modifications to compare inside box temperatures with a control box. Diana provided the study site on her acreage east of Salem, and performed the four or more temperature measurements each day on each of the five boxes for 19 days. We are encouraged by the results and specific recommendations are made at the end of this article.

Background: how birds use heat

Eggs require heat to incubate, specifically 93 to 100 degrees F. Bluebirds, like many species, lay all of their eggs, usually one per day, before starting to incubate. The eggs tolerate the normally cooler temperature for the five to six days it takes for all the eggs to be laid.

But if the inside box temperature is at the incubation temperature or higher for several days, the eggs may start incubat-

ing without the hen's help. This is seldom beneficial, even if the conditions produce perfect temperatures. If the first egg starts to incubate before its siblings and they successfully hatch, the later chicks may not be able to compete for food with the older chicks. And if the temperature in the nest is over 103F for parts of several days running the eggs are unlikely to survive.

Chicks, for a period of about seven days after hatching, cannot self-regulate their body temps. They rely on the ambient temperature and their mother to stay in the right temperature range. At first, the hen spends most of her time on the nest, leaving only short periods for feeding. If the box temp is high enough, she will leave for longer periods, and the chicks will tolerate some heat or cold fluctuations. But the hen has an innate sense of how warm to keep them, and regulates this by her sitting or going.

Hence, the hen can adjust for cooler temps, but cannot cool the eggs or chicks, and can only provide the chicks moisture in the form of insects to help them get through hot spells. The chicks can lose heat by three methods: a) body radiation, b) cutaneous cooling with some water loss, and c) respiratory evaporation by panting, which produces the most significant loss of moisture. One Internet site suggested the older chicks start to be stressed by ambient air heat at about 82 F. At that temp, their bodies react mildly, but as the temp rises,

so does the reaction, until at some point dehydration shuts down all systems.

How high a temperature kills? One study done by an early bluebird researcher, Larry Zeleny, in 1968, indicates the mortality level is 108F or higher. At that temperature death can occur within hours. Studies by the chicken egg industry shows temperatures of 103F for several days will kill egg embryos.

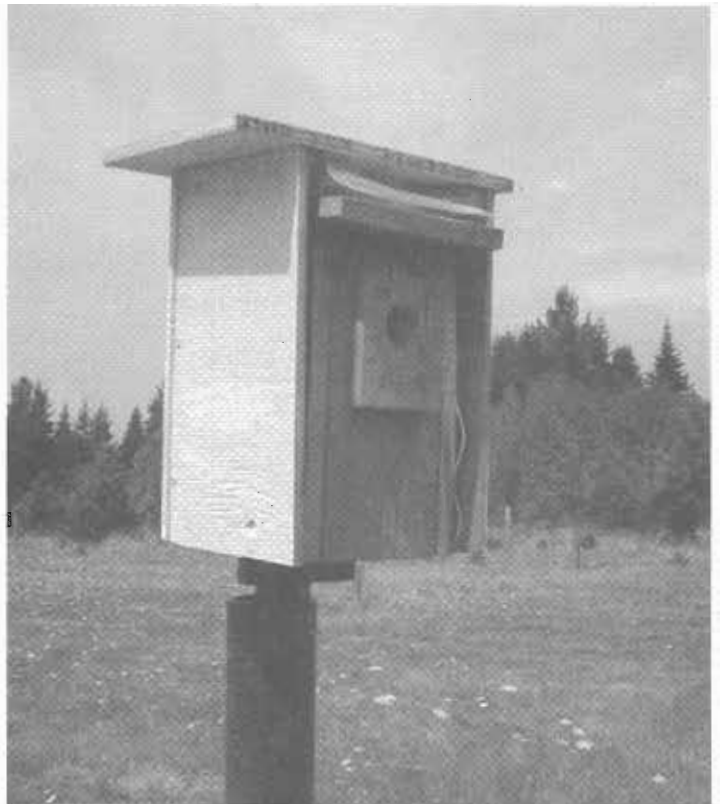
Death will also depend on other variables, such as how much moisture chicks get from food, how long the high temp lasts, and the bird's age. Our results found that boxes in open sun in the Salem area can easily have inside temperatures over 107F if the ambient air temperature is over 95F. The highest Salem area temperature recorded in 2004 was 104F, which could have produced an inside box temperature of over 116F.

Study Design

The focus of our study was to minimize inside box temps, not to drastically alter the basic box design. We worked with the box already used in our program and approved by the North American Bluebird Society (NABS). It is an upright box, made of ¾-inch cedar, with a floor four by five inches, 10.5 inches high, and a 1.5-inch round opening. The sloped roof is slightly wider than the box, and has about a two-inch overhang over the front side. The box front is hinged for access and has a double



The vented box



The hooded box



The foil box



The backboard box

thickness of wood where the hole is located as a raccoon guard.

For ethical reasons we did not use active nests where live birds or eggs might be harmed as we watched. To control the exposure variables we could not have gotten five pair of bluebirds to nest within the 50 to 60 feet of the study site, as the birds are territorial. Also, an occupied nest would introduce new variables of nestling body heat, less air space, and perhaps drafts created by the comings and goings of the parents. These obviously affect real conditions for the birds, but are beyond the scope of this study.

The boxes were in a fairly flat open area, with full sun, altitude of 325 feet, and mounted on six-foot-tall 2x2 wooden risers, which were lashed to steel T-posts for support. All of the boxes had the fronts facing east, so the sun hit the front in the morning and the back got the hotter afternoon sun. (This is the standard orientation for bluebird boxes in our area.)

We measured the inside temperatures with five electronic home thermometers (Oregon Scientific), which have a sensing tip at the end of a wire. All five devices were tested and were within a range no greater than .5F. The sensor probes were mounted in each box three inches above the floor and one inch from the back wall. The thermometer units themselves were placed in a plastic bag and kept outside each box. Temperature readings were taken from four to six times per day, with typical sampling times being: 6:15 a.m., 9 a.m., 12 noon, 2:30 p.m., and 6 p.m. All of the boxes were checked at each sampling, taking about five to eight minutes.

The high ambient air temperature at the Salem Airport was tracked for each day of the study, in order to correlate our findings with advice to landowners on what predicted temperature should trigger precautions.

We also performed tests on another technique to minimize box temperatures, which is to open the box front about one

Date	Airp	Cntrl	Hooded	Vented	Backbd	Foil
8-10	94	106.9	95.0	104.5	96.4	96.3
8-11	95	107.1	96.4	105.1	97.7	98.1
8-12	92	105.6	93.9	103.5	96.8	95.7
8-13	91	101.5	91.0	99.0	93.2	92.5
8-14	90	103.5	92.1	100.9	95.4	93.7
8-18	88	100.9	91.4	99.1	91.2	91.4
8-19	91	104.5	93.2	102.7	95.0	94.5
Avg.	91.57	104.29	93.29	102.11	95.1	94.6

Temperature comparison by day by box type. Airp is the temperature at the airport in Salem on the day indicated. Cntl is the Control box.

inch during the hottest part of the day to improve ventilation. Since this is not a box modification, requires certain precautions, and was not studied for the entire study period, we will report on this technique separately.

Heat Shield Techniques

Control box: no modifications.

Hooded box: a 3/8-inch plywood cowl was constructed to cover the top, back and sides. Only the front was not covered. All exterior surfaces were painted white. Through the use of wooden spacers, there was about a 1-3/4-inch air space on the back and top, and 3/4-inch between the box and the sides.

Vented box: Three 1/2-inch holes were drilled on each side of the box, near the roofline.

Backboard box: a 1/2-inch plywood board was attached to the back of the wooden riser, which supports the box. It was both taller and wider than the box, and completely shaded the box in late afternoon.

Foil box: household aluminum foil was used to cover the top, back and sides of the box. The foil was shiny side out, and molded to fit tightly to the box. Air space between the foil and box was minimal.

Results

During the 18-day study, some days did not have all of the boxes set up, some days had the open-front technique applied, and other days were windy and/or cloudy, producing cooler temperatures. After eliminating those days, we had seven days with comparable data for comparison. The highest temperature (F) for each box on those days is shown below.

Discussion

Clearly three of the modifications keep the temperature lower inside the boxes. The Hooded modification is the most effective, with an average temperature 11.0 degrees (F) cooler than the Control box. The Foil box was next in efficiency with an average 9.69 degrees cooler (F), followed closely by the Backboard modification with an average 9.19 degrees (F) cooler.

Each method has advantages and disadvantages, and no study was done to determine if the modifications would attract or facilitate predators. The Hooded box requires some materials cost and carpenter skills to produce. The Foil box is the cheapest method, but a strong wind may tear it off the box. The Backboard method can be done with scrap plywood, but there was an indication in our data that it actually radiates heat to the box in the morning sun. It also requires a somewhat sturdier post to protect it from the wind. Also, the ques-

tion of whether to keep these modifications only during hot weather or throughout the breeding season has been posed. It may be that in early spring the full sun actually may help the birds, and a heat shield would keep the boxes too cool.

This experiment does not demonstrate that the modifications will be sufficient to save eggs or chicks in hot weather. There are too many variables in heat deaths to predict how hot is too hot, and it may be different for eggs versus chicks. But these modifications do reduce the inside box temperatures significantly and give a margin of safety for the birds.

Special Door Ventilation Technique

Some of our boxes also had an additional technique used on certain days to control heat build-up. Utilizing the top-hinged front panel, we opened the front so that the bottom of the panel was ajar about one inch to improve ventilation. This study

was not as extensive as for box modifications but there was an indication that this technique effectively prevented about two to three degrees of heat build-up over and above the impact of any box modifications.

Some precautions about this technique must be stated, however. If the chicks are old enough to actively move about the nest, they may fall out of the nest box. Opening the box front could expose the eggs or chicks to night predators, so the landowner would have to be available daily to open and close the box. And if there are house cats in the area, this technique should not be used.

Recommendations

Artificial cavities, such as nest boxes, lack the insulating thickness and ventilation of a dead tree snag. If we want to encourage and enjoy birds in nest boxes we need to optimize their safety during hot weather.

1. Some form of heat shield should be used on occupied boxes in full sun whenever the predicted ambient air temperature is 90 degrees or greater.

2. Heat shields should be used only during hot weather, as box warming may be beneficial in cooler periods.

3. Assure that the box support can handle any weight or wind-load of an added heat shield, to prevent the box from being knocked down when eggs or chicks are inside.

4. Any of these three heat shield methods are acceptable: Hoods, Foil covering, or Backboard.

(This article first appeared in the May 2005 edition of The Kestrel, newsletter of the Salem Audubon Society, Salem, Oregon. Both Mr. Gallagher and Ms. Gardener are residents of Salem. Mr. Gallagher can be reached by email at galacres@worldnet.att.

Bird temperatures run high. Why?

The town we were in is just large enough to have a bank with the ubiquitous flashing sign out front. The flow of red letters told us that the stock market had fallen slightly that day, that the time was shortly after three in the afternoon, and that the temp was four degrees short of 100.

No one needed to tell us about the heat. The air conditioning in our van was barely keeping Jude (my wife) and me comfortable as we drove east across South Dakota. This was mid-July, so the heat was no surprise. We were prepared, and did the best we could to keep cool.

The birds we saw along the county and state roads we drove did the same – the best they could. Under the prairie sun, on land where the only shade in sight was provided by fence posts, their best looked insufficient.

We actually saw Lark Buntings employing

the slices of shade from those posts. The birds were perched on the fence wire, tight to the post in the few-inch sunless swipe that offered small respite.

Many of the birds we saw coped by assuming an extreme posture. They straightened out the ankle joints (what many of us consider to be the bird's knees) to stand high and clear. They spread their wings to gain more air contact. They panted, opening their bills wide for more air exchange.

Among warm-blooded creatures, birds run hotter than most other animals. Eighty percent of all bird species are warmer than the warmest 10 percent of mammals. Why is this so?

The primary reason is that higher body temperature allows an animal to maintain a high activity level at all times. Birds are active through the day, in all seasons, in all parts of the world.

Other advantages are that at higher tem-

peratures, nerve impulses travel faster, muscle strength is increased, and physical endurance is greater. All of these things are important to birds if they are to fly, to capture prey, and to avoid capture themselves. It is believed that a constant higher body temperature also aids memory and improves learning ability.

These advantages come with a price. To maintain high body temps, the animal has to eat a great deal (eating like a bird actually means the opposite of what my mother meant when she spoke those words). And, higher body temperature puts birds closer to the point where proteins in the body begin to break down and cause death.

Controlling body temperature, then, is critical. That brings us back to the Lark Buntings and meadowlarks we saw trying to keep cool atop pasture fence posts.

Birds do not sweat. Sweating is one of the ways we cool ourselves, but birds don't

enjoy that advantage. Sweating consumes large amounts of liquid, but water on the summer prairie, for example, can be as hard to find as shade. We used quick-stop stores to replenish our cooler with ice and Gatorade. Birds have other strategies.

They give up excess heat by exposing body parts to the air. Standing tall with wings spread effectively increases functional body surface, allowing more heat to escape. Compressing feathers against the body would reduce the insulating qualities of the feathers, and promote cooling. Many species of birds also have fewer feathers in warm weather than they do in colder months, again reducing the insulation factor.

Birds open their bills wide and pant in hot weather, to increase heat exchange between blood and inhaled air. This is the most important means birds have to cool themselves, the most commonly seen solution to the problem. The respiratory rate of House Sparrows will increase from 57 breaths per minute at 86 degrees Fahrenheit to 160 per minute at 109 degrees.

Birds change location on hot days. At midday in summer, birds in almost any neighborhood can be hard to find. They are laying low in the shade somewhere, keeping cool. The birds we saw in South Dakota looked like they were having a rough time, but birds are extremely adaptable creatures, having evolved effective strategies for coping and surviving in a wide variety of extreme conditions.

Take away our civilized accouterments, and they were going to outlast us on those South Dakota prairies, that was for certain.

— Jim Williams



This juvenile Western Meadowlark was trying to beat the heat in South Dakota one July afternoon by standing high and spreading its wings. Both actions were meant to cool the bird by increasing the body surface exposed to air. (Photo by Jim Williams.)

Next Bluebird deadline is Oct. 31

The deadline for the Winter 2006 issue of *Bluebird* will be Oct. 31. Earlier submissions always are appreciated. The editor prefers to receive material by e-mail (no attachments, please) at two-jays@att.net. Postal address is Jim Williams, 345 Ferndale Road N, Wayzata, MN 55391. Include a self-addressed stamped envelope if you wish return of manuscripts or photographs. Letters to the editor are welcome. Letters may be edited for length and content.

Time to renew?

Your address label, found on the back page, contains the date your NABS membership expires. **Is it time to renew your membership?** If so, please do it today, using the form on this page. If you prefer not to cut the magazine, use a photocopy of the form or write on a sheet of paper the information requested, and send that with your payment in the envelope enclosed with this issue.

Black flies

Areas receiving excessive spring and summer rains can be plagued with large black fly populations. These insects will attack warm chicks, especially those five days old or older. Experiments in Wisconsin indicate that black flies need moving air, and might not enter a nest box that has only an entrance hole. Try blocking the vent holes, but be sure to open the holes when the warm season comes. Aerosol parents containing pyrethrin will help keep flies away, but are effective for only a few days.

(Adapted from an article in the newsletter of the Bluebird Recovery Program of the Audubon Chapter of Minneapolis.)

Concerned bluebirders are offering mealworms more than ever before, increasing the chances of bluebird survival in stressful times. How about earthworms?

No. An abandoned bluebird, adopted by concerned humans, might gulp down a piece of earthworm. Bluebird parents might even feed their young earthworms during hard times. But the undeveloped stomachs of the nestlings have difficulty digesting the dirt castings found in the earthworm's gut.

This causes diarrhea, loss of fluids, and dehydration. The birds can become so lethargic they no longer beg for food. In

Worms are a no-no

addition, the fecal matter, liquid now instead of encased in a fecal sac that parent birds can remove, dries and hardens in the nest. The nestlings can become stuck to the nest by their own waste, unable to move or fledge. (Check your nests after fledging to make certain there are no stuck chicks).

(Adapted from the Pennsylvania Bluebird Society newsletter, as reprinted in the newsletter of the Bluebird Recovery Program of the

Editor's note: See Research Review, page 17, 'Feeding Nestlings'.



Cats Indoors
The campaign for safe birds & cats

The truth about cats and birds

We all know that cats don't have nine lives. But here are other myths to dispel.

- 'Belled' cats do kill wildlife. Cats with bells on their collars can silently stalk their prey. Even if the bell rings, birds and other wildlife do not necessarily associate the sound with danger.
- Even well-fed cats kill wildlife.. The urge to hunt and the urge to eat are controlled by different portions of a cat's brain.
- Cat-injured wildlife seldom survive, even if they appear to have escaped. Infection from a cat's teeth or claws results in death unless antibiotics are given immediately.

PROTECT CATS, BIRDS, AND OTHER WILDLIFE BY KEEPING CATS INDOORS!

For more information, contact the AMERICAN BIRD CONSERVANCY
Cat Indoors Campaign, 1250 24th St., Suite 400, Washington, DC 20037
Phone 202-778-9666. Fax 202-778-9778. Email abc@abcbirds.org

Imagine migrating flocks of hundreds of bluebirds

The following story has been taken from a longer article that appeared in the journal The Wilson Bulletin, discussing what spring migration of Eastern Bluebirds was like in Charles City, Iowa, 88 years ago.

March 14, 1917, shall go down in all written bird records of our part of Iowa as Bluebird Day. The first bluebird record for that year was reported on Feb. 25. That is an unusually early date for the appearance of the bluebird (here). Then came a newspaper article asking for reports on birds seen in the area. Eighteen observers reported bluebirds.

One flock was estimated to consist of at least 200 individuals. Another, reported by several observers, contained about 100 birds. At noon that day a flock of 82 was counted by Harold Fredrickson. Reports also came from five other sources of scattered pairs or small flocks of bluebirds in town. Later in the day, a report came from the edge of some woods three miles northwest of the city of a flock of probably 200 bluebirds seen flying. Some of the flock paused and made a meal of asparagus berries left from the preceding year. There was evidence that the migrants were hungry for they were reported by several observers as stopping long enough to pick up some dried berries or other seed food.

(Typical winter weather slowed migration until March 21, when the day again was warm and spring-like.) A flock of 150 bluebirds was seen by Mrs. Ella Webster at her home, and Harold Newton saw a flock of 100 individuals the same day. After this, the new order was introduced, for the robins, meadowlarks and red-wings came, then, winter had surely gone and spring had arrived.

There is a beautiful prophetic spirit in the appearance of the bluebird so very early, before man has even dared to dream that spring is at hand. Each year, we welcome this bird with more grateful hearts than on the year preceding.



'Enough' food for winter can be a fatal problem

Food supply is critical for all bird species that winter where the weather can turn cold and foul at short notice. Bluebirds are among those birds vulnerable to the vagaries of changing weather. Birder Bob Fisher of Independence, Missouri, recently offered these observations on the e-mail network Birdchat.

•••

The idea that any bird can make it through a winter if there is enough food has its limitations. "Enough food" may involve copious amounts of a very specialized diet. According to (one authority), the Eurasian Goldcrest must find an insect on an average every two seconds to make it through the day. Likewise, the North American Golden-crowned Kinglet survives by gleaning large numbers of dormant insect larvae from spruce needles. These birds seem to know how to find copious amounts of their particular target food by constant activity in the right places. The insect larvae they need evidently are usually present throughout the winter in their preferred northern habitats.

Other more opportunistic species may discover an adequate food source in a particular location and die when it runs out. Or it may suddenly become insufficient to sustain them when a severe cold snap occurs. Or, as is probably the case with some of the hummingbirds that linger around feeders, a food source that will get them through the day cannot get them through the night.

In Missouri, where I live, we usually have lots of Eastern Bluebirds (our state bird) around during warm winters. But they are "half hardy" species. When it gets very cold, most of them disappear. Perhaps they migrate south just before the cold front arrives, but there is evidence that many may perish.

Sometimes sizeable groups are found dead huddled together in a bluebird house when the temperature suddenly gets below zero for a week or two. Others may die and not be found. In either case, a sufficient food source may suddenly have become insufficient.

In those years, Eastern Bluebirds that were genetically predisposed to migrate south in the fall make it through the winter, while those who were tempted to stay by a lingering food source may not survive.

(Mr. Fisher can be reached by e-mail at bobfisher@comcast.net.)

Brood patch is important in incubation

Perhaps you have removed a female bluebird or swallow from her nest to have a look at her eggs or hatchlings and noticed that she had bare skin on her belly.

That bare spot is known as the brood patch, and it plays an important role in incubation and brooding.

A few days before the female bird lays her first egg, feathers on her breast and belly fall out. She loses both outer (contour) feathers and the down beneath. It is believed that increasing levels of the hormone estrogen trigger this feather loss. The estrogen would be a byproduct of breeding and egg formation.

The bare skin contains blood vessels feeding the skin. These vessels expand, bringing greater amounts of warm blood to the area. The heat from the blood is transferred to the eggs or chicks. In addition, the brood patch swells as large amounts of water collect in the tissues beneath the patch. Research suggests that this water also helps transfer heat from the female to the eggs or hatchlings.

The brood patch develops only on those birds that incubate. If male birds do not participate in incubation, they have no brood patches. Males that do incubate have patches. Among cavity-nesting species, Great-crested Flycatcher and some woodpecker males develop patches. Male birds that might or might not incubate, as is the case for Tree Swallows, will have a brood patch if the incubation role of the male is important.

Passerine species — songbirds, like bluebirds and swallows, wrens and chickadees — have a single brood patch. Other species can have more than one patch, each separated from the others by normal feathering. Herring Gulls, for example, typically lay



The brood patch on this female Eastern Bluebird is easily visible as she is held and someone gently blows on her breast/belly feathers. (In this photo, the bird's head is out of the picture at lower right, its tail to the upper left.) This bird had been captured for banding this past breeding season at Hilton Pond Center for Piedmont Natural History in South Carolina. This and the cover photo were taken at the same banding session, and give us a wonderfully close look at this special species. (Photos courtesy of Bill Hilton Jr., director of Hilton Pond Center, a non-profit research & education organization in York, South Carolina, 803/684-5852. Visit the web site at www.hiltonpond.org.)

two or three eggs, and will have a brood patch for each.

Waterfowl also have brood patches. Hens of these species will pull down feathers from their breast to help create the patch, and then use the feathers to line their nest.

Most birds with brood patches use the patch to warm hatchlings until the young birds have developed the ability to control their own temperatures, usually day five or six for bluebirds.

When brooding is completed, the blood

vessels shrink, the swelling recedes, and the feathers grow back, often before the next molt.

— Jim Williams

(Information for this article was taken from the Cornell Lab of Ornithology Handbook of Bird Biology, published in association with Princeton University Press, and The Manual of Ornithology by Noble S. Proctor and Patrick J. Lynch, published by Yale University Press.)

Research Review

Bluebird eyesight

Near Butlet, Pennsylvania, we have a pair of power-distribution wires crossing several hundred yards 30 feet in the air. The herbage below is grass, briars, and low bushes. Eastern Bluebirds sit on these wires, their heads bent down, apparently intent on the ground below. Suddenly, one of them will dive down, sometimes to a point perhaps 10 yards to one side of the point directly under the wire, instantly capturing a caterpillar, which the bird immediately takes, not to the wire itself, but to the power pole or cross arm supporting the wire, a more convenient perch for barring the grub into pulp.

I can see no explanation except that the bird actually sees the caterpillar up to 40 or 50 feet away, and deliberately uses the vantage point of the wire to study the area below quite minutely. One caterpillar, we could see through binoculars, was a large cecropia or allied form, but others were much smaller. Hawks, we know, can see mice and other small objects from a much greater height, but we have supposed it was movement on the part of mice that betrayed them.

Caterpillars of the cecropia type are very quiescent creatures, remaining motionless for long periods while they digest their food, then moving up the stem of the plant an inch or two to a convenient leaf, mowing it quietly into their mouths, then backing down to the stem and relapsing into a motionless condition. Most other caterpillars are comparably quiet.

Yet, the bluebird spots them, even with a brisk breeze blowing so that all the vegetation of the countryside is in motion. Most passerine birds seem to hunt their food in a myopic way; titmice, warblers and vireos diligently search at close quarters. Flycatchers, like bluebirds, watch from a vantage point, but it is one thing to see a lively, flying insect in mid-air, and quite another

to see a lethargic, camouflaged caterpillar in the brush.

(This article has been adapted from a report by F. W. Preston and J. M. McCormick, Butler, Pennsylvania, originally published in The Wilson Bulletin, June 1948 Vol. 60, No. 2.)

Time of egg laying

At what time of day do Eastern Bluebirds lay their eggs? And, why might one time of day be more advantageous than another?

Two Canadian researchers pursued answers to those questions in a project conducted in Ontario in 1994. Results of that research were published in *The Wilson Bulletin*, Vol. 107, No. 2, in 1995. Information for this summation of that work is taken from that article.

The time of day a female bird lays her eggs varies with species. Most songbirds lay shortly after sunrise, however. Exactly when laying occurs can be difficult to determine, for obvious reasons, but knowing this can be important for people studying the strategies various birds use to ensure successful reproduction.

Male birds, for instance, often try to mate with females of neighboring pairs, to take every opportunity to pass along their genes. Male bluebirds ate among those species engaging in mate guarding, a behavior intended to prevent copulation by its mate with another male.

In most songbirds, eggs are fertilized at 24-hour intervals. The next egg in a sequence is fertilized in the hour after the laying of the previous egg. The time of egg laying thus indicates the time of fertilization, according to the authors of this study.

In species where male birds compete with each other for copulation with females, the hour after egg laying should be the best time for copulation attempts. This is because mating at this time offers the

best chance to be the male who fertilizes that next egg.

This then becomes the time when mate guarding is most important.

The female Eastern Bluebirds in this study all laid their eggs after 6:30 a.m. local time, and at least one hour after sunrise. The median time of egg laying was approximately two hours after sunrise.

The time of egg laying varies considerably among species. Other research projects offer this information: Red-winged Blackbirds, for instance, lay as early as 4:30 a.m. Tree Swallows tend to lay between 5 and 7 a.m. For Gray Catbirds, egg laying tends to come about two hours after sunrise. American Robins were found to favor mid-morning, an average time of 10:30 a.m.

Why morning? Early or later? The authors of this study said that this question has not been frequently addressed. A few hypotheses have been presented, however.

One researcher suggested that females lay early in the morning to free them for routine daily activities that otherwise might endanger the egg. Eggs are most vulnerable to harm just before they are to be laid. If an egg is laid in the early morning, the critical hours fall at night when the female bird is likely to be least active, offering small threat to the wellbeing of the egg.

Having an egg in the oviduct does not seem to constrain robins, however. And so, another researcher attributed egg-laying times to the times the birds find best for copulation.

Another theory suggests that feeding strategies can influence the time of laying. Tree Swallows, for instance, might be expected to lay early in the day. Free of the weight of the developed egg, the female swallow would be better able to fly, important because this species takes all of its food on the wing. As the day progresses and warms, more insects are aloft, thus making aerial maneuverability later in the day important

to female Tree Swallows.

“Species such as Eastern Bluebirds or American Robins, which forage on the ground or from a perch do not need to fly as much,” the authors wrote. “Holding an egg is probably of little consequence to foraging efficiency.” They add, however, that these hypotheses have not been adequately studied, and that other reasons might exist to explain timing. They say that most likely different factors come into play for different species.

In an interesting aside, the authors mention that female Brown-headed Cowbirds lay their eggs on average nine minutes before sunrise. Seven species of birds chosen by the cowbird to host eggs all lay their eggs after sunrise. The research project from which this information was taken suggests that laying early might be an adaptation the cowbird has made to help ensure that its eggs remain in the host nest and are incubated.

Feeding nestlings

Female adult Eastern Bluebirds fed nestlings more often than males, and feeding frequency of birds in the nest increased with nestling age until just prior to fledging, when a decline occurred. These are among the findings of a bluebird study made in Michigan in the early 1970s.

The study was made by Benedict P. Pinkowski, its results published in the March 1978 issue of *The Wilson Bulletin*. (This article is taken from that paper. Some rewriting has been done.)

Pinkowski reported that feeding rate of males and females combined was relatively constant through the day, although females fed young more often earlier in the day and male feeding rate was greater later in the day.

Larvae of butterflies and moths were the most common food of both nestlings and fledglings, comprising about one-third of the diet. Grasshoppers also were common, especially in summer. Spiders were



Fruit is an important part of fledglings' diet. This young Eastern Bluebird is seeking its own food. (Photo by Jim Williams)

particularly important early in the season and for newly hatched young. Fruit was uncommon in the diet of nestlings, but was fed to fledglings in summer, comprising just over 10 percent of the diet.

Adult males and females fed different foods to the young. Males fed significantly larger percentages of crickets and earthworms; females fed more spiders and grasshoppers.

Here is a summary of insect species fed to nestlings: Larvae of butterflies and moths (caterpillars) comprised the largest percentage (32.4%) of animal food noted in the nestling diet. Adult moths accounted for a small percentage of the insects recorded. No adult butterflies were fed to the nestlings studied. Orthopterans were the second largest group represented (25.6%) and included grasshoppers, crickets, katydids and mantids. Spiders, including egg sacks, were the third largest group (11.3%), and generally consisted of wandering, ground-dwelling species. Other insect species less frequent in the nestling diet were beetles, earthworms, various ant species, and millipedes.

Foods fed to fledglings differed from those fed to nestlings. Butterfly and moth larvae were more common in the fledgling diet, reflecting peak consumption in June when the young birds were out of the nest. Earth-

worms and beetles also were more common in the fledgling diet. Fruit (mulberries and cherries) made up just more than 10 percent of the fledgling diet, and was noted only in July and August.

General observations indicated that the adult Eastern Bluebirds feed smaller items to fledglings than nestlings. Feeding patterns of adults foraging for fledglings differ from those of adults feeding nestlings. Fledgling bluebirds spend most of their time in large trees, and alternate active and inactive periods. They begin calling when hungry, and, depending on food availability, receive several feedings until satiated. Adults obtain many of the food items for these fledglings within a few yards of the young birds, often by gleaning from the tree tops. This results in many small items fed in rapid succession to young out of the nest. This is in contrast to the longer trips with larger items made regularly by adults with young in the nest.

In some areas, male and female bluebirds foraged at equal distances from the nest. When a difference in foraging distances was noted, male birds seemed to remain close to the nest. Pinkowski speculated that this was because male bluebirds play a greater role than females in defense of the nest against intruders.

The importance of tree snags for cavity-nesters in urban areas

By **Christina M. Rohila/Blewett**
and **John M. Marzluff**

Some cavity-nesting birds do not use nest boxes, but must excavate their own cavities in order to reproduce. To do this they require dead or dying trees (also called snags), because patches of soft, decaying wood allow for excavation.

Snags are removed by humans because of danger or aesthetics, leading to drastic reductions in populations of cavity-nesting birds.

This has been studied extensively in response to timber harvest, and snags are now conserved for wildlife during some timber harvests.

Urbanization also causes snags to be lost during conversion of forestlands to settled areas, and when homeowners remove snags on their property. There have been few studies exploring the impacts of urbanization on cavity-nesting bird populations, and none on snags as a possible link to the loss of these birds in urban areas.

We studied nine species of snag-nesting birds in the greater Seattle area of Washington, one of the fastest growing areas in the country. Our results show that very few snags exist in settled areas (neighborhood developments), that undisturbed forest lands within settled areas retained high snag densities, and that overall, urbanization reduced population levels of all nine bird species.

Our study shows that the birds are reproducing and possibly maintaining their populations at sites that retain forest. We show that these species need not be lost entirely if the landscape is managed by

retaining at least 30 percent forest within settled areas. This means forest patch size greater than 12 acres (5 ha) that contain high snag and live-tree densities and large-diameter snags and trees.

Details of the study design

Suburban sprawl dominates the landscape, causing natural habitats to be lost, fragmented, isolated, and degraded over time. Our goals were to investigate whether

different amounts and patterns of urbanization have differing effects on snags and therefore cavity-nesting birds. We wanted to develop recommendations for urban planners for conserving snags and cavity-nesting birds in rapidly growing areas.

We investigated factors controlling snag densities, snag characteristics, bird densities, and bird reproductive success at our study sites. We studied eight species of na-

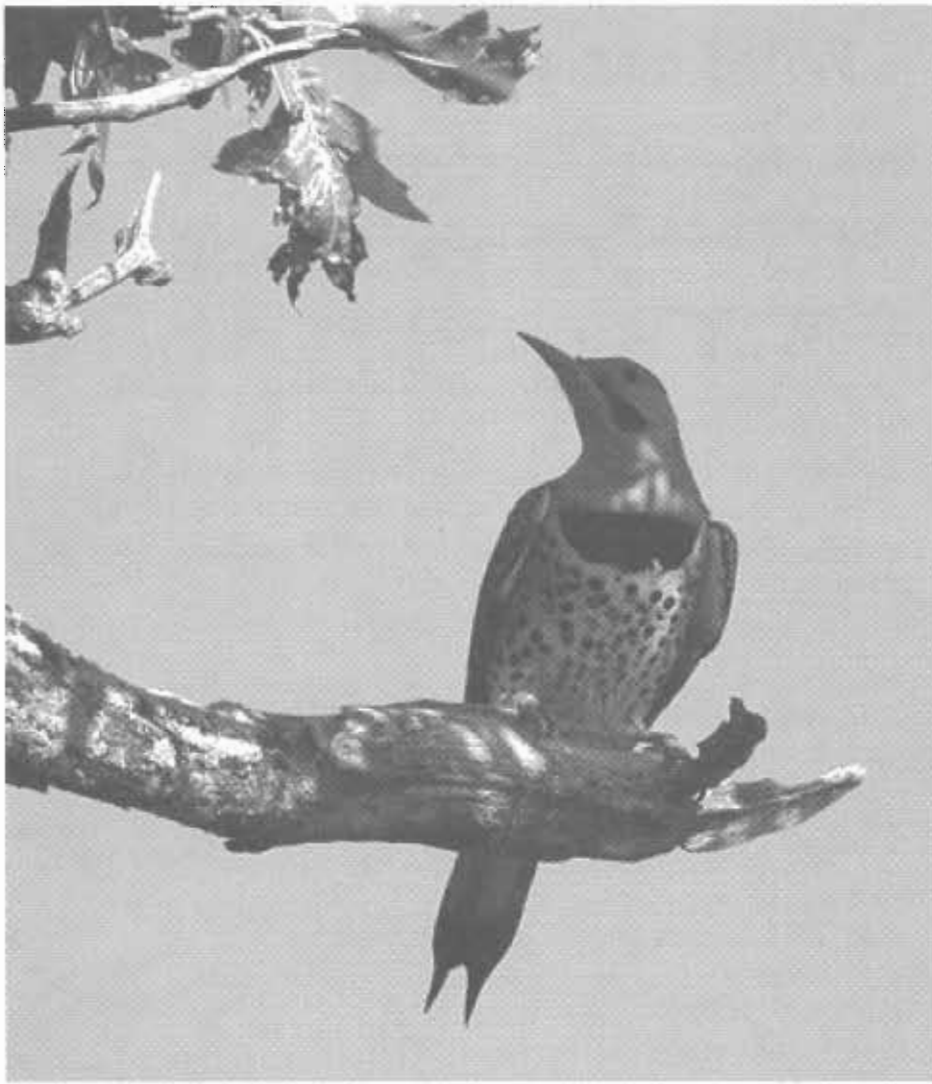
This is how the study was done

The sites we chose ranged from those containing mostly settled areas (no forest and 95 percent single-family residential) to sites containing mostly forest (less than one percent settled and 96 percent forest). Along this gradient of high to low development, we selected sites varying in the pattern of settled and forested lands. Some sites had clumped housing and the remainder forest. Some sites had the housing and forest intertwined with each other.

We counted snags within the settled and forested areas to acquire density estimates, and collected information on snag qualities, such as size (diameter), height, tree species, and decay. Information on the state of decay was particularly important because none of these bird species can excavate in perfectly sound wood, especially the chickadee and nuthatch species which require very soft wood to excavate.

We grouped snags into size classes (small, medium, and large diameter) for density analyses, because different bird species can nest in different size snags based on body size. For instance, small birds such as Black-capped Chickadees, Chestnut-backed Chickadees, Brown Creepers and Red-breasted Nuthatches are able to use any size class. Hairy and Downy Woodpeckers, Red-shafted Flickers and Red-breasted Sapsuckers are medium-sized birds, and are able to use medium and large snags. Our largest woodpecker, the Pileated Woodpecker, can only use the large-diameter snags.

We collected bird data during one breeding season (March to July) by mapping all territories of each bird species within the settled and forested portions of the study sites, visiting each territory one to two times per week to monitor breeding behavior, and searching for nests.



Northern Flicker

tive cavity-nesting birds: Black-capped and Chestnut-backed Chickadees, Red-breasted Nuthatch, Red-breasted Sapsucker, Hairy, Downy, and Pileated Woodpeckers, and Red-shafted Flicker.

We used species that excavate their own cavities because they would be expected to show preferences for or against particular snags, compared to species that use existing cavities (e.g. Violet-green Swallow) that were rare or did not nest in snags in our study areas. We also studied the Brown Creeper, a common bird in our forest zone that does not use cavities, but requires decaying trees for nesting as it places its nests under loose bark.

We chose 49 study sites that were one

square kilometer (250 acres) each.

Results and Recommendations

We found few to no snags in neighborhoods unless there was a forest fragment there. Most forest fragments retained high densities of snags in all size classes. In fact, densities were as high as those found by other studies looking at snags in forestlands far from settlement. This was surprising, as we expected human influence to reduce the number of snags, and indeed we saw snags being removed, and saw evidence of human disturbance in those forest patches (trails, forts, garbage). But if the forest patches were larger than 2.5 acres, many snags remained.

We were also surprised to find that the amount and pattern of settlement influenced snag densities very little. The most important predictor of snag densities within both settled and forested areas was live tree density. This is a simple but important result: to conserve snags we must first conserve live trees, as they are the source of snags.

We then compared characteristics of snags and live trees between settled and forested areas, and found that only three differed significantly. Live tree diameter, live tree density, and snag decay were much greater in the forested areas.

This implies that densities of snags, especially large snags, will remain low in settled areas, and that snags are removed in settled areas before they have a chance to decay and become dangerous or unsightly.

In short, settled areas do not contain many snags, and snags that do exist are not as useful to cavity-nesting birds. This may help explain the loss of cavity-nesting birds in settled areas.

From our results thus far, we can conclude that to retain snags in urbanizing areas we need to retain forested areas, preferably those containing high densities of trees, including large-diameter trees.

But how much forest do we need to conserve, and does the arrangement of forest and settlement matter?

First, we found all nine species of birds at four of the 13 study sites. These sites contained from 27 to 60 percent forest, with the settled areas highly interspersed with the forested areas. Therefore, we recommend that planners always retain at least 27 percent forest within developments.

Second, we did find strong relationships between settlement pattern and both bird densities and reproductive success. These relationships differed by species. For example, some bird species were at their highest densities only at sites with large areas of forest (70 to 95 percent forest: Chestnut-backed Chickadees, Brown Creepers, and

Hairy and Pileated Woodpeckers), while other species were at their highest densities in landscapes with settlement and forest interspersed with each other (27 to 60 percent forest: Red-breasted Nuthatches, Downy Woodpeckers, and Black-capped Chickadees, and Red-shafted Flickers). Red-breasted Sapsuckers did not respond to settlement pattern, but simply were at their highest densities at sites with high densities of snags.

All species, however, were negatively affected by urbanization. Only two of our study species were found at highly urbanized sites, Chestnut-backed and Black-capped Chickadees. But they were found at extremely low densities (one to four territories per 250 acres).

In fact, densities of all nine species at all study sites were much lower than found in forests far from settlement, despite high snag densities in urban forest fragments.

Productivity was high for all nine species. We found 321 territories, and all species fledged young at more than 50 percent of their territories, except for the Downy Woodpecker. (We only found six Downy Woodpecker territories, so we cannot draw conclusions from this small sample.) We found 117 nests. Of these, only 26 failed (snag felled by housing construction, predation, nest snag fell naturally, abandonment and competition).

Competition between native species and non-native species for nest cavities was low. Only five nests (four flicker, one sapsucker) were taken over by European Starlings. However, this occurred only in snags in neighborhoods (e.g. back-yards, along streets). Starlings were not found within forested fragments, and when flickers and sapsuckers nested in forest fragments, they fledged young successfully.

As large areas succumb to urban sprawl it would seem unwise for all developments to be done in the same way. Retaining more than 30 percent of the forest within settled areas, in forest patch sizes greater on average than 12 acres, can be considered a

What can you do to help?

Individual homeowners can also help conserve native cavity-nesting birds. Larger patches of undisturbed habitat are better than smaller, so several homeowners can conserve or create bird habitat together, thus creating a larger patch.

More complex vegetation provides better habitat (having ground vegetation, shrubs, small trees, large trees, dead logs, snags, and live trees with dead branches) thus attracting more species.

We do not recommend retaining snags in your yard that may be a hazard to people or property, or to retain snags if they harbor non-native competitors such as European Starlings.

Find ways to reinforce trees and snags, and exclude non-native species. It is better to remove these than to attract wildlife at the cost of your safety and theirs.

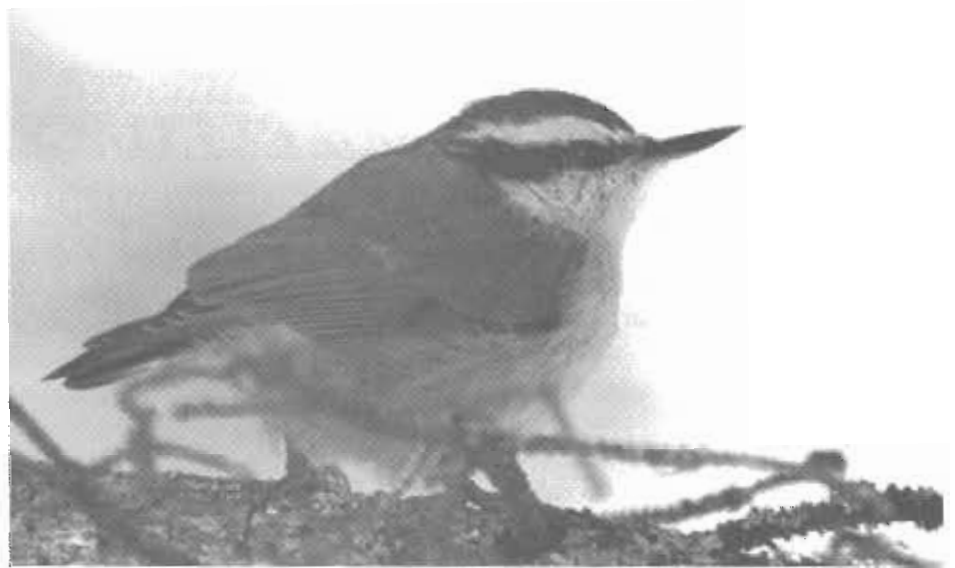
And of course, the use of nest-boxes can benefit some species, if non-natives are discouraged from use.

management base line. To maximize densities and reproductive success of all nine species, some developments should retain 60 to 90 percent forest in patches 50 to 75 acres (20 to 30 ha).

We did not study all factors potentially influencing cavity-nesting birds in urban areas, and we suggest the following for future studies: the use of feeders and nest boxes, the use of live trees (natural cavities) for nesting, how altered predator communities impact nest success (large numbers of housecats, crows, and eastern grey

squirrels), and the influence of dispersal (important for finding new territories/mates) and over-winter survivorship to population levels.

(Ms. Rohila can be reached at Washington Department of Fish and Wildlife, 600 Capitol Way North, Olympia WA, 98501-1091, e-mail rohiltmr@dfw.wa.gov. Dr. Marzluff can be reached at University of Washington, College of Forest Resources, Box 352100, Seattle, WA 98195. This article is a summary of the project; contact the author for a complete manuscript.)



Red-breasted Nuthatch (Photos by Jim Williams)

NABS Holiday Gift: 'Sam's Guide to Bluebirds'

By **Pauline Tom**

A special NABS Holiday Gift: With each \$30 Family Membership you give as a gift, and with each \$30 Family Renewal, NABS will send (gift wrapped) "Sam's Guide to Bluebirds", retail value \$24.95.

This is a two-disc set, one DVD and one CD-ROM covering all three bluebird species. Included are species profiles and how-to information on selecting a nest box, mounting the nest box, predator control, care and management of nest boxes, and making a bluebird nest box.

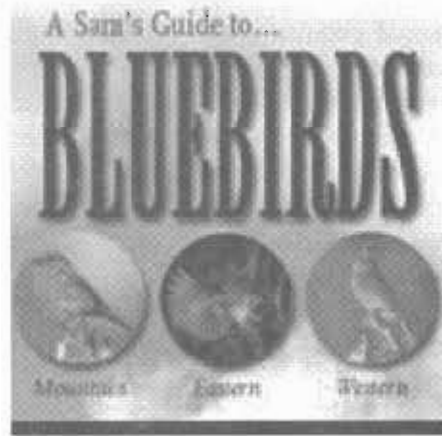
The CD is cross platform — it runs on both PC and Macintosh computers. Users can move from screen to screen, finding stunning photos, a brief species description, and Arthur Bent's account for each species.

The DVD has more video than the CD, including an informative and entertaining 30-minute presentation by NABS member Helen Johnson on Mountain Bluebirds. Her knowledge and love of bluebirds comes shining through.

The versatile CD and DVD has bluebird photos and sounds entertaining and informative for all ages, pre-school to experienced bluebirders. A provided password grants access to additional web site material. Portions of the CD and DVD are suitable for use during speaking engagements with an LCD projector and laptop computer (with CD-ROM / DVD drive). For instance, the CD includes photos of dozens of cavity-nesting species.

This offer is made possible through the generosity of Sam Crowe, developer of fun and easy-to-use DVDs and CD-ROMs covering various aspects of birds in North America.

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A juvenile Eastern Bluebird: Enjoy bluebirds and other species on the Sam's disc set.

Two Audubon biographies

The name Audubon is synonymous with birds and birding in America. It labels field guides, a magazine, a national organization, local clubs, and more. John James Audubon is the person whose name is so widely used. He is known foremost as a naturalist and artist, the painter of what continues today as the most captivating illustrations of American birds ever.

Two biographies of Audubon recently have been published. The first is by a Minnesota author, William Souder, entitled "Under A Wild Sky" (North Point Press, \$25). The second is John James Audubon, the Making of an American" by Richard Rhodes (Knopf, \$30).

The subject is the same, but these are different books.

Audubon arrived in America in 1803. From the beginning, Rhodes wrote, "he wanted to make art of bird illustration, to bring the birds he drew back to animated life ..."

He was less skilled when he began than he was 35 years later, as his mature work was being published. His early work lacked the style and vigor that makes his later paintings such a joy to see. So it is with Souder's account of Audubon's life: it seems stiff and dry. One cannot imagine that Souder is an Audubon fan.

Rhodes, however, gives us an adventure story that does for Audubon what the artist did for birds: he brings Audubon back to animated life. Rhodes is an unabashed admirer of his subject.

Audubon the painter also was Audubon the businessman, the passionate husband, the loving father, the woodsman, the sharp-eyed reporter and critic of the United States in the first half of the 19th century (Rhodes makes ample use of Audubon's journals and letters). All are captured here in entertaining prose.

Afterword: Even a casual interest in birds

Book Reviews

By Jim Williams

should eventually lead you to a book containing reproductions of Audubon's bird paintings (these biographies do not fill that need). There are many published collections; choose one the largest page size you can find, and take your time as you browse. These are not field guides. Audubon's work is art.

Getting to know Canada Geese

Bernd Heinrich has written several natural history books, two about common ravens, which are among my favorite birds. Had he not been the author of "The Geese of Beaver Bog" (HarperCollins, \$24.95), I would probably have passed on it. I've never been very interested in Canada geese.

But now I know how to identify Canada geese by the individual. (The white facial patch varies in size and shape, bird to bird.) I have learned that these birds are believed to be monogamous only if both male and female return to the same breeding location each year. (They bond with the pond, not the mate.) I know why some goose families boast a dozen goslings while others have but two or three. (Predation creates smaller families, while adoption creates the larger ones.)

Heinrich is a scientist. And on a few occasions, I found myself abandoning the careful prose of the researcher to scan ahead to where he once again becomes a beguiling storyteller. But Heinrich has done something I thought no one could: He has given me a fresh outlook on one of the creatures common to our landscape.

Garden projects

"Projects for the Birder's Garden" (Rodale Press, \$17.95) boasts more than 100 "easy things you can make to turn your yard and garden into a bird-friendly haven." And this book delivers on its promise.

Feeders, birdbaths, drippers, nest boxes, seed selection and storage, even dealing with squirrels and cats - it's all clearly covered here and augmented with helpful drawings. There are sidebars and helpful hints on almost every page, and the do-it-yourself projects, particularly construction of feeders and nesting boxes, are well chosen. They'll appeal to the budget-minded among us, nor a bad thing when you can easily spend 50 bucks for a feeder in the store.

While this book is aimed at beginning or intermediate birders, it has a trick or two to teach long-time birders, as well. It could serve not only as a guide for your to-do list but also as a handy reference to add to your bird bookshelf.

Birding gear

Looking for a one-stop place to shop for almost anything you might want or need to enjoy bird outings? That place is the American Birding Association sales department. ABA publishes a 78-page catalog that is yours for the asking.

In it you will find optics (binoculars and spotting scopes in all price ranges), birding gear and clothing, field guides covering almost every region of the world, basic birding reference books, sound recordings, videos, and birding computer software. The selection of books about birds and birding is the best you will find anywhere.

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BLUEBIRDING SUPPLIES FROM NABS HEADQUARTERS

ITEM #	DESCRIPTION	AUTHOR/SOURCE	COST	QTY	TOTAL
B-1	The Bluebird Monitor's Guide	Griggs, Kridler, Berger	\$15.00		
B-2	Bluebird Trails – A Guide to Success	Dorene Scriven	\$12.00		
B-3	The Bluebird Book	Don & Lillian Stokes	\$13.00		
B-4	Enjoying Bluebirds More	Julie Zickefoose	\$4.00		
B-5	Mountain Bluebird Trail Monitoring Guide	Myrna Pearman	\$4.00		
V-1	Bluebird Basics Video	Don & Lillian Stokes	\$12.00		
EP1	Educational Poster & Pocket Field Guide	NABS	\$7.00		
PFG1	Pocket Field Guide	NABS	\$1.50		
EP2	Education Packet	NABS	\$6.00		
SP1	NABS Bluebird Slide Program	NABS --80 slides & script	\$55.00		
T1	Van Ert Universal Sparrow Trap	Floyd Van Ert	\$11.00		
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TBT1	TBT Trails Signs for Nest Boxes	NABS	\$2.00		
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OTHER SOURCES OF BLUEBIRD RELATED ITEMS

In order to make bluebird nest boxes and related items available to NABS members at the lowest possible cost, we have listed the names of reliable suppliers who sell quality goods at reasonable prices. A portion of the profits from these items is donated to NABS. Please Contact these suppliers directly; **do not send these orders to NABS.** These companies do not take credit cards. Visit our website www.nabluebirdsociety.org for photos of items listed here.

Nest Boxes, Nest Box Kits, Bluebird Feeder -- from Ahlgren Construction Inc.

PRODUCT	DESCRIPTION	COST	SHIPPING	SHIP EA ADD
Peterson Nest Box – Kit Form	Solid Cedar with Hardiboard Sides	\$10.00	\$8.00	\$2.00
Peterson Nest Box Assembled	Solid Cedar with Hardiboard Sides	\$12.00	\$8.00	\$2.00
NABS Style Box – Kit Form	Solid Cedar, side opening, bottom hinged	\$10.00	\$8.00	\$2.00
NABS Style Box – Assembled	Solid Cedar, side opening, bottom hinged	\$12.00	\$8.00	\$2.00
Noel Predator Guard	Wire Cat/Coon Guard	\$2.00	\$6.00	\$0.25
Noel Guard for Peterson Boxes	Wire Cat/Coon Guard w/ Adaptor	\$3.00	\$6.00	\$0.25
Jail Style Mealworm Feeder	Solid Cedar with Dowels	\$12.00	\$7.00	\$2.00

Send check or money order to: **Ahlgren Construction Inc.**, 12989 Otchipwe Ave. N., Stillwater, MN 55082. Cannot ship to a post office box, must have a street address. Cannot ship outside USA. MN residents add 6.5% sales tax. To receive these special prices, put "NABS DISCOUNT" on your order.

Gilbertson PVC and Gilwood Boxes

PRODUCT	DESCRIPTION	COST	SHIPPING	SHIP EA ADD
Gilbertson PVC Nest Box	PVC Box, Cedar Roof	\$12.00	\$7.00	\$3.00
Gilwood Nest Box - Assembled	Cedar, sealed w/ caulk	\$15.00	\$8.00	\$5.00

Send check or money order to: **Steve Gilbertson**, 35900 Dove St., Aitken, MN 56431. Cannot ship to a post office box, must have a street address. Cannot ship outside USA. MN residents - add 6.5% sales tax. To receive these special prices, put "NABS DISCOUNT" on your order.

Cedar Valley Ground Sparrow Trap

PRODUCT	DESCRIPTION	COST	SHIPPING
Repeating Sparrow Trap	Large Wood and Wire Trap	\$45.00	\$10.00

Send check or money order to: **Afton Cedar Works**, 3364 Pennington Ave. S., Afton, MN 55001. Cannot ship to a post office box. Orders must include phone number –required by Fed Ex. Cannot ship outside USA. MN residents - add 6.5% sales tax. To receive this special price, put "NABS DISCOUNT" on your order. **All prices effective 1-30-2005.**

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North American Bluebird Society, PO Box 244, Wilmot OH 44689-0244



BLUEBIRD published by

North American Bluebird Society
P.O. Box 244
Wilmot, Ohio 44689

Fall 2005
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