Maine Eastern Bluebird Nest Box Monitoring Program

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A Project of the
Maine Natural History Observatory

Introduction

Thank you for your interest in Maine's Eastern Bluebird Nest Box Monitoring Program. This is a project coordinated by Maine Natural History Observatory in partnership with the Maine Bird Atlas, a project of the Maine Department of Inland Fisheries and Wildlife. Your efforts to place nest boxes in appropriate breeding habitat and monitor their use will help us to understand the breeding distribution of bluebirds in Maine and increase the number of nesting options for this remarkable species.

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

Why Monitor Eastern Bluebirds?

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

Unlike many grassland bird species, Eastern Bluebirds are generally believed to be increasing in number throughout their breeding range, although we don't know about them specifically in Maine. Much of this increase as been attributed to the increased availability of man-made nesting sites. Because Eastern Bluebirds are so willing to nest in nest boxes, this species is one of the most studied bird species in North America.

While Eastern Bluebirds are believed to be increasing in number, they are still vulnerable to threats like habitat destruction or alteration. Eastern Bluebirds are also particularly vulnerable to competition with invasive species including the European Starling and House Sparrow. Understanding the issues which negatively impact this species will require a better understanding of the species' distribution during the breeding season and their breeding behavior at nesting sites.

Natural History

The Eastern Bluebird is a highly recognizable species with a long history of monitoring in North America (see http://www.nabluebirdsociety.org/). While this species is known to use the nesting cavities created by woodpeckers as nest sites, artificial nest boxes put out by people now play a large role in the species' breeding success. This species, which is most associated with open country, often nests in close proximity to human activity. Farms, orchards, pastures, and other agricultural lands all provide suitable breeding grounds for this charismatic species.

The Eastern Bluebird is a small thrush species, a family of birds that includes the familiar robin. Males sport vibrant blue upperparts with orange throats, breasts, and flanks. Females are more subdued in appearance with blue-gray upperparts and pale orange-brown throats, breasts, and flanks. Both males and females have white bellies, large dark eyes, and small black bills. Juveniles are gray-brown, have white eye rings,

typically show blue in their wings, and have splotchy brown and white breasts. The songs of the Eastern Bluebird can be loud, rich, and warbling or soft and whispered (Dendroica (https://www.natureinstruct.org/dendroica/) is great resource where you can look up any species and hear a variety of the sounds that they make). A vocalization, often characterized as "*tu-a-wee*", is often given by adults and nestlings about to fledge. Calls are variable and include squawks, chips, and harsh-sounding screeches typically given when threatened. Nestling can sometimes be heard given high-pitched begging calls from inside their nest boxes.

While Eastern Bluebirds can certainly be found in habitats with a high degree of human alteration, they are also known to inhabit grasslands and open-understory forests. Eastern Bluebirds feed on insects and often ambush their prey from perches (often the tops of their nest boxes in the breeding season). These birds will also feed on a wide variety of fruits in late summer.

Eastern Bluebirds begin forming pairs before migrating to their northern breeding grounds. This means some birds will arrive at their breeding grounds already paired while others will find a mate upon arrival. Males locate suitable nesting sites and display for females who arrive to inspect the cavity. Females may beg for food items as part of pair bonding, but is not always a part of courtship. Males will guard females and will chase off competitors. Pairs will remain together through the breeding season and may raise multiple broods under the right conditions.

Eastern Bluebird nests are typically composed for dry grasses and small twigs with a lining of fine grasses. Females are typically responsible for gathering materials and constructing the nest over a period of 4-5 days. Both males and female incubate eggs and incubation lasts approximately 15 days. Males and females feed nestlings which typically remain in the nest for 15-18 days before fledging. Re-nesting is common in Eastern Bluebirds. Males will continue to care for fledged young while females incubate and feed second broods.

Eastern Bluebirds in Maine

Although Eastern Bluebirds live throughout much of North America year-round, this thrush species lives on only a small portion of Maine year-round. Eastern Bluebirds can be found in the extreme southwestern portion of the state through the winter months. In the breeding season, however, they are widely distributed throughout the state and can be found in every Maine county.

Nest Box Monitoring

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

Where to Install Nest Boxes

Eastern Bluebird nest boxes should be installed on a post in grasslands, meadows, agricultural areas, pastures, old fields, shrublands, orchards, and on the margins of open forests with little undergrowth. Sites with adjacent perches such as

small trees, bushes, and other scattered low to medium height vantage points are especially suitable. Sites with extensive tree cover and limited open space for foraging should not be used.

Nest boxes should be installed between 4′ and 6′ in height on a post. The box should ideally be installed with its opening facing east towards open habitat. The box should be easily viewable from 30′ away and birds should have a clear flight path to the box. While volunteers are welcome to install and monitor more than one nest box, each bluebird box should be installed a minimum of 300′ apart.

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

Monitoring Protocol

Here in Maine, the Eastern Bluebird breeding season runs from approximately 10 May until 15 August. These safe dates indicate the time period where most migrating birds have already reached their breeding grounds. As such, these dates will serve as the start and end date for conducting nest box monitoring. Nest boxes should be installed by 1 May, if possible, to best ensure that the box is considered by arriving males.

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

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

During the first few weeks of nest box monitoring, your efforts will be entirely focused on observing Eastern Bluebird breeding behaviors at the nest box. You may observe behaviors which indicated that breeding is possible or probable. In some instances, you may be able to confirm breeding even during these early weeks. Make note of breeding behaviors you observe during your monitoring visit on your data sheet. A possible indicator that Eastern Bluebirds breed in the area would be the presence of an adult in appropriate habitat (code **H**) or hearing a singing adult (code **S**). There are several probable indicators of breeding which maybe observed. An adult visiting a probable nest site (likely the nest box) should be coded as **N**. Males perform courtship displays in which they perch at the nest box opening with their wings and tails spread while holding nesting material. They then enter the nest box, peek out with the material still in their bill, and then perch on top of the box while spreading their wings. These (along with copulation and food transfers) should be coded as **C**. Skirmishes between males early in the breeding season are part of territorial defense and should be coded as **T**. The presence of a pair moving together and interacting in the area should be coded as **P**. If you hear singing adults heard in the area 7 or more days apart use code **S7**. Confirming bluebird breeding will likely occur during the latter portion of the season, however, you likely will observe adults carrying nesting materials (such as

grasses and small twigs) (code **CN**) or carrying food (typically insects or sometimes fruit) to the nest box (code **CF**) before you begin your nest box visits.

23 June to 15 August: During this latter part of the survey period (once eggs are suspected to have been laid), volunteers are asked to limit their observations to once every two weeks. During this part of the project, view the inside of the nest box to note the number of eggs and/or nestlings. Once at the nest box, volunteers will gently tap the outside of the box (to encourage any adults to leave the box), open the box, count the number of adults, eggs, and/or nestlings, and close and secure the nest box. You may discover that a second brood is laid during this period. If this is the case, note this in on your datasheet and repeat the monitoring protocol. If any young fledge prematurely with the disturbance, gather them up and put them back in the nest box. You may need to put your hand over the hole for a few minutes while the young settle before you can quietly move away. Take care to avoid inhaling any dust from old nests and always wash your hands after working at a nest.

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

During the latter portion of the season, your observations will be largely focused on your nest box visits. You are encouraged to note any other observed breeding behaviors you see during this period on the comment section of your data sheet. Count the number of adults present when making your visit then count the number of eggs and/or nestlings visible during your nest box check. Eastern Bluebirds typically lay 4 to 5

eggs. Eggs are glossy and are blue without markings. Nestlings have pink skin, grayish down, and bright yellow mouths. Again, **there is no reason to reach into the box or touch any of the birds.** Simply note what you are able to see from your vantage point outside the box. If the pair begins a second brood after fledging their first, begin the monitoring protocol anew (beginning with distance observations).

Reporting your results

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

Maintaining Nest Boxes

Proper maintenance of a nest boxes is just as important as nest box placement. Nest boxes should be cleaned and, when necessary, repaired between seasons. At the end of the season (once all the young have fledged and the nest box is unoccupied), take down the bluebird box. Aiming to remove the box by 1 September should allow adequate time, however, leave the box up longer (2-3 weeks) if the box is still being used by nesting songbirds. Leaving the box up between seasons will shorten the life of the box and could mean squirrels, wasps, mice, or other species could nest in the box. Take down the box, empty it of any nest materials (wear gloves) while taking care not to breathe any of the dust that stirs up, and store the nest box in a dry, protected place until the next field season. Do not use any cleaning solutions when cleaning out the box. If there is a build-up of debris stuck inside the box, use warm water and stiff-bristled brush to clean out the box (dry in the sun before storing). If any major repairs are needed, consult the nest box design instructions to complete the repairs yourself so long as you are comfortable doing so.

A note on competition with non-native birds: Introduced Old World species such as European Starlings and House Sparrows often compete with native species for nest boxes. The smaller diameter openings used for Eastern Bluebird nest boxes may help in excluding these species. These introduced species threaten native wildlife and are therefore not protected by state or federal laws. There are two options for if invasive bird species take up residence in your Eastern Bluebird nest box. Option 1: Nest box removal. Once an invasive species moves into the box, it is very unlikely that bluebirds will use the box that same field season. Therefore, volunteers who are comfortable doing so are welcome to remove nest boxes for the season and dispose of any materials, nests, and eggs associated with an invasive species discovered in an Eastern Bluebird nest boxes. These contents should be disposed of well away from the nest box. Option 2: Continue your observations. While preventing invasive species from nesting is the ideal solution, some volunteers may not feel comfortable disposing of invasive species nesting materials and eggs. That is okay. If that is the case, you are encouraged to continue your observations. If you observed European Starlings or House Sparrows entering the box, inspect the box as soon as possible to confirm the invasion and either remove the box for the season or continue making observations of the invasive species. If one of these non-native or any other native species takes up residence in your nest box, note the species in the comment section on your form. If a *native* bird species takes up residence in the box, simply make note on your data sheet and continue your observations. Native bird species should not be disrupted regardless of if they are the project's target species.

A note on competition with other wildlife: Occasionally, you may discover that other forms of wildlife have taken up residence in your nest box. These may include mice, squirrels, insects, and snakes. These animals can be removed from the nest box if

you are comfortable doing so. Should you decide to remove these animals, proper precautions should be exercised during this type of maintenance. If rodent nests are found within the box, remove the contents with gloved hands. Small paper wasp nests can be manually removed from boxes and destroyed with a gloved hand. Do **not** use any insecticides to exterminate insects as these products may contain chemicals which can be hazardous to nesting birds using the box. If a particularly large nest of stinging insects is suspected or detected, make note. Large stinging insect nests will likely have to be removed at the end of the season. Unless discovered and removed quickly at the beginning of the season, the presence of any of the animals discussed above will likely mean bluebirds do not use the nest box this field season. Any box which is invaded by these non-bird animals should be relocated to a new location the following field season. Do **not** risk injury to yourself for the sake of nest box maintenance.

Nest Box Plans

A good nest box design must be secure from predators, weatherproof, simple and inexpensive to construct, monitor, and maintain, and the target species must accept and use the box to successfully fledge healthy young. A limited number of Bluebird nest boxes are available free to volunteers. If we have run out of our supply of nest boxes, you can get on a waiting list when additional nest boxes are available, or you can build your own using the plans below. See the “Contact” section should you have any questions about the nest box plans. These nest plans were generously shared by the North American Bluebird Society. Note that the dimensions given in these plans do not need to be measured to the nearest fraction of an inch - natural nest holes where bluebirds nest are variable in size and their openings also differ in size and shape. There is room for experimentation in nest box design, defense against predators, and location.

Using wood from scrap piles or even driftwood will help to keep costs down. **Do not paint or treat the wood for a nest box with any preservatives.** It is often helpful to use a marker to number your nest boxes so that it is easier to keep track of multiple nest boxes.

Materials:

- Standard board 1" x 6" x 4' long
- Standard Board 1" x 10" x 10 ½" long (for roof)
- (20-30) 1 ½" Exterior Screws (trimhead)
- (2) 8 Penny Common Nails, galvanized (for hinge)
- (4) 3" wood screws or galvanized lag screws and washers (for mounting)
- (1) 2" hook and eye (for locking the nest box)
- Cordless Drill
- Staple Gun and staples
- Table Saw
- Skill Saw or Chop Saw
- Jig Saw or 1 ½" hole saw
- Hammer
- Caulking Gun and Acrylic Latex Caulk (optional)

Instructions:

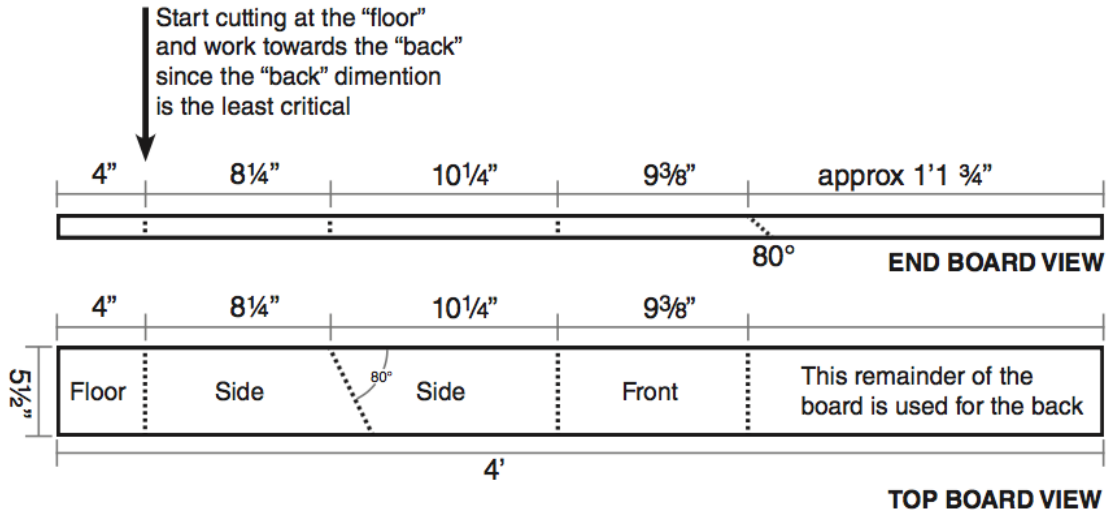
1. Begin by assembling all necessary tools and nest box components. Your materials should consist of front, fixed side, opening side, bottom, back, roof, and a latch (to secure the opening side).
2. Preassemble the nest box to ensure the fit of each part - make adjustments as necessary.
3. With the box still preassembled, attach the Front of the box to the Fixed Side and the Bottom with 1 ½" exterior screws. **Special note**: The Bottom should be installed approximately 1/2"-1" from the bottom edge of the front and sides of the box. This will help prevent rain from running into the box during storm events.

4. Place the box with the Front facing down and fasten the Back of the box to the Fixed Side and Bottom with 1 ½" exterior screws.
5. Turn the box over with the Back facing down. Fasten the Roof to the Front, Back, and Fixed Side of the box using 1 ½" exterior screws. Do not attach the Roof to the Opening Side.
6. Now to install the opening side. Ensure that there is large enough gap at the top of the Opening Side so that you can open the box once the hinge nails are installed. Hammer a galvanized nail through the Front of the box through the top of the Opening Side. Turn the box over and nail through the Back of the box into the Opening Side exactly opposite the first nail. These nails will function as a hinge.
7. Install the hook and eye latch on the bottom of the Opening Side. This will keep the Opening Side of the box securely fastened.
8. Place the box with the Front facing up. Using a 1 1/2" hole saw, cut an opening through the front of the box. Clean out debris from inside the box.
9. The nest box is ready to deploy!

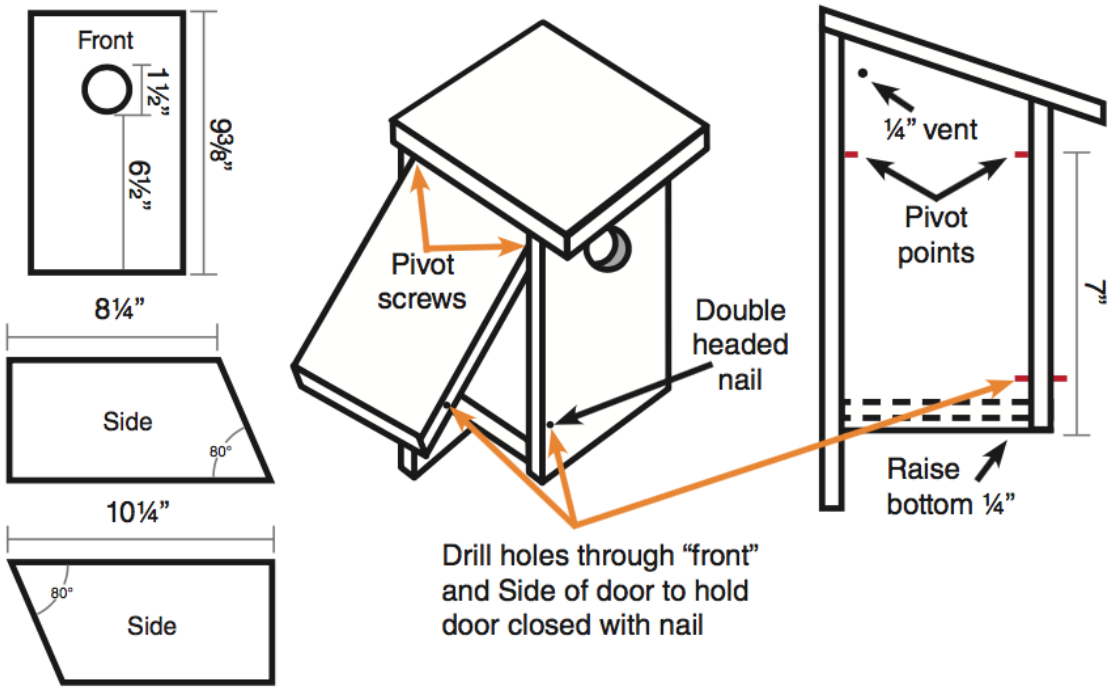
Helpful tips:

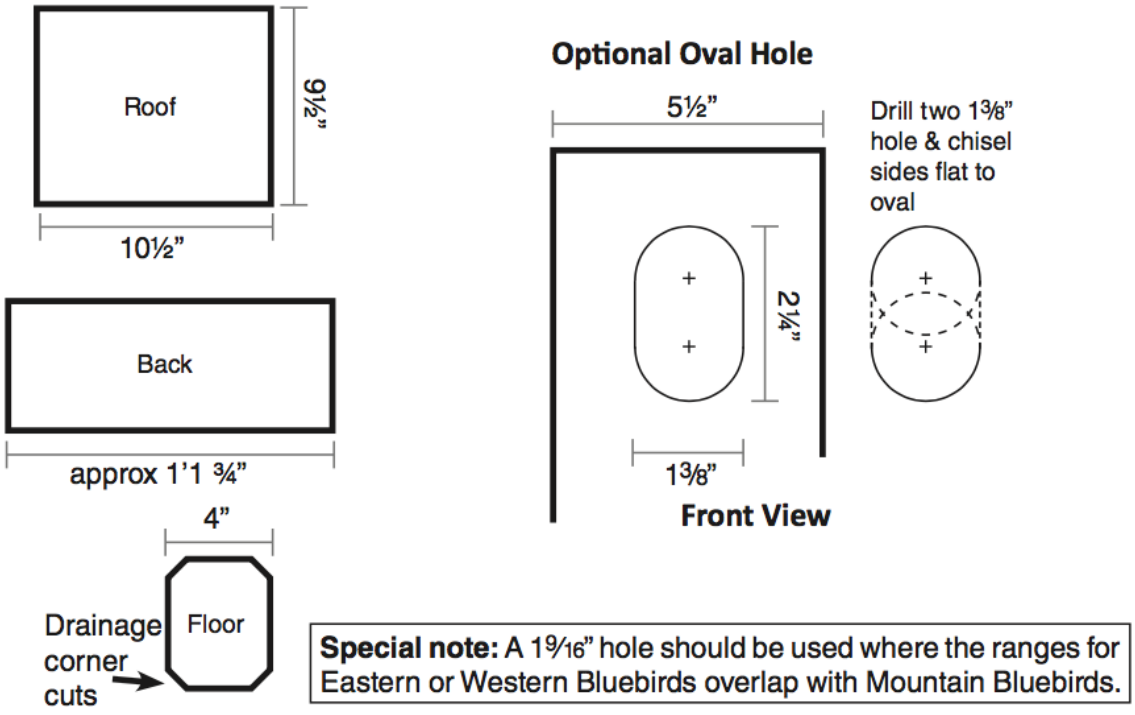
- Predrilling all your holes will help prevent splitting when fastening the box together.
- Do not use wood glue on your nest box. Doing so will make replacing a damaged component on the box far more difficult. Instead, use a thin bead of acrylic latex caulk along the seams of the box (barring the Opening Side). As the nest box continues to dry and shrink, you can add caulk to seal any cracks that form.
- Be careful when handling the predator guard and when removing the piece of flashing cut out for the opening of the box. These will have sharp edges.
- You can add a piece of hardware cloth or a small block on the inside of the box below the opening to make it easier for nestlings to access the opening.
- There is much good information about predator control at bluebird boxes. We suggest checking out the information at the North American Bluebird Society regarding predator control (http://www.nabluebirdsociety.org/PDF/NABSFactsheetPredatorControl.pdf).

Board Diagram



Construction Plan





Contact

For questions regarding this project, please contact:
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