

Bird-Friendly Building Legislation: A Policy Toolkit

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Introduction

Bird collisions with glass structures result in the deaths of over one billion birds annually in the United States. Addressing a problem of this scale requires systematic and enforceable solutions. Passing bird-friendly policies is the most effective way to ensure long-term, widespread change by requiring new construction to incorporate proven collision-reduction strategies. Unlike voluntary measures, legislation creates consistent standards that protect birds across entire communities and removes the burden from individual developers, ensuring that bird-safe design is a standard practice rather than an optional consideration.

This toolkit is designed to guide communities, policymakers, and advocates in developing and promoting effective bird-friendly legislation. We cover strategies for community engagement, guidance in writing legislation, and insights into successful legislative frameworks.



Collisions FAQ: Getting Clear on Birds and Glass

Glass collisions kill vast numbers of birds in the United States each year. Yet most Americans know little about this danger, and even fewer are aware of the solutions available to help prevent these deaths — fixes that in many cases are easy and inexpensive. Knowing the answers to these frequently asked questions about bird-window collisions will help prepare you for conversations with legislators and other advocates.

1) *How many birds are killed by glass collisions in the U.S. each year?*

Because glass is used so widely, giving a definitive answer is difficult, but Smithsonian researchers attempted to do so in 2014.

They estimated that homes and other buildings one to three stories tall accounted for 44 percent of all bird fatalities. Larger, low-rise buildings four to 11 stories high caused 56% of deaths, and high-rise buildings, 11 floors and higher, are responsible for less than 1% of total collisions. Individual skyscrapers can be quite deadly for birds, but they kill fewer birds overall due to their limited numbers.

By combining these numbers, the Smithsonian reported that collisions likely kill between 365 million and 1 billion birds annually in the United States, with a median estimate of 599 million¹.

We believe that the true number is closer to a billion, or higher, for several reasons. For one, data used in the study is now more than ten years old, and there has been a steady increase in glass use since that time, increasing the likelihood of fatal collisions. In addition, we've learned that bird carcass reports tend to underestimate deaths (see questions 4 and 5), meaning that more dead birds go uncounted than we realized.

This means that the only anthropogenic (human-caused) threat that kills more birds in the United States each year is domestic cats².

2) *Why do birds collide with glass?*

Transparent glass is invisible to both humans and birds, but humans can use door frames and other visual clues to anticipate the presence of glass and avoid collisions — most of the time. Birds, of course, don't share this ability. They perceive reflected images as literal objects, which explains why glass reflections, especially ones that present images of food, shelter, or an escape route, can trigger collisions. Learn more by visiting our "[Why Birds Hit Glass](#)" page.

3) *Are birds okay when they hit windows and fly away?*

After colliding with glass, some birds may be only temporarily stunned and without lasting injury — but often they are not so lucky.

In many of these cases, birds suffer internal hemorrhages, concussions, or damage to their bills, wings, eyes, or skulls³. While they may be able to fly temporarily, birds with even moderate injuries are far more vulnerable to predators and other environmental dangers. A [recent study](#) of window collision victims treated at wildlife rehabilitation centers found that 60% of those birds die.

In many instances, however, birds are killed immediately and never fly away.



4) *Why don't I see birds that have been killed by collisions more often?*

Collisions often go unnoticed at both homes and commercial buildings for several reasons. First, many of the birds that hit windows do not die immediately and fly off without leaving a trace.

One study found that, out of 29 window collisions, only two birds died immediately and left a carcass that at the foot of the window⁴. However, birds can sustain severe injuries such as fractured bones and beaks, concussions, and internal bleeding³, so even birds that initially fly away likely die elsewhere.

Second, for those birds that do die and end up at the base of the building, animal scavengers often quickly remove carcasses. Cats, raccoons, birds of prey, and even squirrels, can learn to wait at windows where collisions occur for an easy meal.

Birds may also fall on inaccessible rooftops, fall through grates, end up in landscaping, or land in dense vegetation that makes them difficult to see.

5) *Do collision monitoring programs find all collision victims?*

Even for intensive collision monitoring programs the total number of dead birds found are always a large underestimate of the number of birds that actually collided with the glass. This is the case for reasons also discussed above.

Many of the birds that hit windows do not die immediately and fly off without leaving a trace. One study found that, out of 29 window collisions, only two birds died immediately and left a carcass that at the foot of the window⁴. However, birds can sustain severe injuries³, so even birds that initially fly away often die elsewhere.

For those birds that do die and end up on the ground, animal scavengers – and people, frequently facilities teams – often remove carcasses before monitors can find them. Collision monitors even report animals, such as gulls and squirrels, learning to wait at windows where collisions occur for an easy meal. This problem is so serious that academic monitoring efforts conduct “carcass persistence studies” to estimate the number of dead birds removed before monitors walk their routes and find them^{5,6}.

The rate at which dead and injured birds disappear can vary a lot from site to site⁷; researchers have found that in some places carcasses are removed within hours⁸ while at others it takes days^{5,6,7}. At some locations in NYC, only 25% of carcasses placed on collision monitoring routes remained when collision monitors walked their routes later the same morning⁸.

Finally, for carcasses that remain, monitors do not always detect all of them⁹. Birds may fall on inaccessible rooftops, fall through grates, end up in landscaping, land in dense vegetation that makes them difficult to see, be swept away in the gutter, or just overlooked because they blend in with the ground.

In one study where researchers accounted for both scavenging and imperfect detection, they estimated that only about 20% of birds killed were actually found by people who were searching for them⁹. So, it is safe to say that any number of birds picked up in a monitoring effort especially if it is not a rigorous monitoring effort, is going to be a small fraction of the birds that actually died and an even smaller fraction of the total number of birds that hit the windows.



6) *How do I stop birds from hitting my windows?*

There are many ways to making windows bird-friendly. One of the best is to use external insect screens. These screens virtually eliminate reflections, and if birds do hit them, the impact is cushioned, reducing the likelihood of injury. An added benefit is that these screens are easy to install on existing or new home windows.

If screens aren't an option, you can use a range of materials — tape, decals, strings, cords, paint, and external solar shades are options — to create window patterns that birds will interpret as solid objects, needing to be avoided. Check out our great home-friendly solutions guide [here](#).

It's important to make sure that birds see no viable way to fly between the markers or objects you're using, so make sure to eliminate all spaces larger than two inches.

Remember, whichever material you use needs to be visible to birds from at least ten feet away so that they have time to see the material and change course.

Bird-friendly window products are effective, inexpensive, and easy to install.

7) *Can I apply something to the inside of my windows to stop bird collisions?*

The best place to apply solutions is on the outside of the window, where they are reliably visible. However, using external solutions isn't always an option. Some windows — like those on tall buildings — can be difficult to access from the outside.

In these cases, we recommend testing some options. This is because different kinds of glass have varying reflective levels and, unfortunately, there is no universal solution.

To conduct a test, apply a sticky note, tape, or sample of your proposed solution to the inside of the window and then look at it from the outside every hour or two, starting in the early morning.

If you can see your test material most of the time, birds will too, and an inside solution may work for you. In many cases, however, internal solutions do not work, because modern glass is very reflective and reflections will hide your solution during part or all of the day, reducing or eliminating its effectiveness.

8) *Will bird-friendly window products obscure the view from my window?*

No, you don't need to impair your view to save birds.

There are effective solutions that cover as little as 1% of the window area, allowing sunlight in and a view out. In our experience, people quickly adjust to bird-friendly design solutions, often forgetting that they are even there. We have also found that when family, friends, or customers notice the pattern and learn its purpose, they appreciate the effort to protect birds.

If you're looking to retrofit existing windows, there is a wide range of solutions from which to select, depending upon personal preferences.

If you are designing a new building or replacing windows, consider the professional solutions favored by architects. Many of these elegant products have enjoyed long-standing popularity among architects for their aesthetic appeal alone. Bird-friendly glass technology is advancing at a rapid rate, and there are more options available than ever before. For more on designing a



new building or replacing windows, visit the "Resources for Architects, Planners, and Developers" page. Looking for inspiration? Check out our bird-friendly building gallery.

9) *Does light cause birds to hit buildings?*

Light can increase collision numbers in several ways. Recent studies confirm that urban glow attracts birds into the human-built environment^{10,11}, where they run a higher risk of collisions.

Migratory birds traveling at night are also attracted by intense lights contrasted against the night sky. The "beacon effect," as this occurrence is commonly known, can be caused by lighthouses, offshore oil platforms, or powerful light displays, like the twin beams at the 9/11 Tribute in Lights memorial in New York City. These lights can disrupt birds' ability to navigate, pulling them off course and effectively trapping them around the light¹². At the 9/11 memorial, volunteers monitor the birds and the lights are turned off when needed to allow safe passage.

Brightly lit building facades can also affect birds. In some cases, these facades and brightly lit windows can cause collisions at night^{13,14}. These birds are seen fluttering at lit windows or exhausted on the ground¹⁴ where they are vulnerable to predators.

Despite the dangers posed by nighttime lights, it's important to note that most collisions take place during the day. These collisions are due to habitat reflected in or seen through glass, and they are often direct and deadly.

While turning off lights is a great way to help birds and other wildlife, as well as humans, the best way to prevent collisions, especially at homes, is to use one of the many options available to treat your windows.

10) *I put a decal up, but birds still hit my windows. What can I do?*

A single decal may be enough to warn an alert human to expect a glass door, but for a bird it's simply an obstacle to fly around.

To successfully deter birds, decals and other collision deterrents must be applied with proper spacing to create the illusion of a cluttered environment through which it would be difficult or impossible to fly. You can learn more here. Remember to make sure that whichever pattern you use on your windows should not have any spaces more than two inches wide.

11) *What can I do about a building that causes collisions in my town?*

The first thing to do is document the problem. Take photos of the dead birds you find and keep a list of numbers and dates.

If there is a facilities or maintenance department, ask what they have noticed; they are usually responsible for cleaning up birds that have died after hitting glass and may be great allies who help you collect data or convince building managers of the danger to birds.

After documenting the problem, review the window solutions on ABC's site, contact the building owner or manager to tell her or him about the problem, and provide advice or resources (such as this blog) on how to address it.

Keep in mind that you are making a request and looking for a partner to save birds, so be sure to keep these interactions positive and non-confrontational. Avoid vilifying the responsible party for a collision problem that they likely had no idea existed.



You can also talk to people who live, work, or shop in the building in question to see if anyone else shares your concerns. If so, ask them if they would like to be involved. By working with others, you build a collective voice that can draw more attention to the problem.

Remember, there are many ways to get involved. These include helping with monitoring, writing letters to building owners, attending meetings with building management, and organizing community action.

12) *What can I do to keep buildings that harm birds from being constructed where I live?*

Buildings designed without bird-friendly design principles have the potential to be deadly for birds. A variety of factors determine the level of the threat they pose, including the amount of glass used, placement and reflectivity of the glass, the height and extent of vegetation around the building, and the presence of water features, among other things.

Given the low incremental cost of constructing a bird-friendly building, we believe that all new buildings — not just glass-covered skyscrapers — should incorporate bird-friendly features. It is less expensive to incorporate these features from the beginning of the planning process, compared to retrofitting a building later.

There are several ways to help make this happen. The first is to develop and pass a local ordinance requiring the adoption of bird-friendly building standards in your community. To download an easy-to-use ordinance template, [click here](#). You can also take a look at our list of existing ordinances mandating bird-friendly design or creating voluntary standards.

Keep in mind that ordinances often apply to large buildings and exempt low rises and homes, where many collisions take place, so it is important to make sure that the ordinance applies to as many building types as possible.

Although passing an ordinance is a great accomplishment, it's not the only thing you can do.

Consider approaching the developers of new and proposed building projects with your concerns. Since this can be a time-consuming process, we suggest focusing on projects with a high likelihood of success (e.g., nature centers, museums) or organizations that influence multiple buildings (e.g., local government, universities, health care organizations, and architecture firms) to help them adopt bird-safe building policies.

While it's critical to make sure that new buildings incorporate bird-friendly designs, don't forget that existing buildings already account for hundreds of millions of bird deaths annually. Consequently, the need to retrofit homes and other buildings will remain an important way to reduce bird collisions for the foreseeable future.

13) *Are all LEED-rated buildings bird-friendly?*

NO. When architects, developers, and other stakeholders intend to create a LEED-rated building, they review available credit options and select enough credits to achieve the rating they seek.

Bird-friendly credits, however, weren't available until 2011, when the LEED program adopted a new, bird-focused building design credit known as "Pilot credit SSpc55: Bird Collision Deterrence." LEED made this a permanent "Bird Collision Deterrence" credit in the Innovation Catalogue in 2022.



Like all credits in the LEED system, the use of this bird-friendly credit is not mandatory. So, while many builders have opted to use this credit, many LEED-rated buildings are not bird-friendly.

Regardless of LEED rating, we strongly encourage architects and builders to incorporate bird-friendly buildings guidelines into their designs. To find out more about testing and LEED ratings, visit our [LEED Innovation Credit](#) page.

14) *When do most bird collisions with glass take place?*

Collisions don't happen at an even pace over the course of a year, or even throughout the day.

Most collisions happen during daylight hours or immediately before dawn, with some occurring at night. Mornings, in particular, tend to be the worst time of day for collisions^{15,16,17, 18}. During migration, this is because birds that have flown all night stop look for a place to land and refuel. Those that land in and near cities find themselves in a maze of deadly glass. In addition, resident birds are generally most active in the morning, as they wake up hungry and immediately search for food.

During the course of a year, migration periods usually bring the largest upticks in collisions, especially in fall, when huge numbers of birds stop to rest, often in unfamiliar areas where glass is common^{10,19,20}. Many collisions programs are focused on collisions during migration in cities, where they tend to occur in large numbers. Migrant mortality in fall tends to be worse than spring due to the larger number of birds in flight. This is because fall migration includes both adult birds and juveniles that were born over the summer. Spring migration includes only adults returning to breed.

But migration is not the only dangerous season. We also see collision increases in late spring¹⁸, as nesting birds fledge their young, and in winter^{21,22}, when resident birds leave their territories and cover larger areas in search of food. In the winter, bird feeders can make nearby windows especially deadly.

15) *What does ABC do to protect birds from glass collisions?*

American Bird Conservancy strives to reduce bird-and-glass collisions by making the human-built environment as safe as possible for birds. To maximize our impact, we focus on the following areas:

Product testing: We operate two flight tunnels to better understand how birds interact with various commercially available or experimental glass treatments (watch our [video](#) to learn more). These evaluations help us create bird-friendly building guidelines for architects and recommend effective solutions for people living in homes and other buildings. As experts in the field, we also evaluate and document scientific literature related to bird collisions.

Legislation, codes, and LEED: We help promote science-based, bird-friendly legislation at national and local levels. For example, we worked with members of Congress to draft the national Bird-Safe Buildings Act, which would require public buildings to incorporate bird-friendly building design and materials. We have also helped to establish building guidelines like the LEED Bird Collision Deterrence Credit (see above). See below for a guide to writing legislation and ABC's model ordinance.



Educating architects and engineers: ABC offers a bird-friendly building design course that architects can take for continuing education credit from the American Institute of Architects, the Green Building Council, and other organizations.

Guidance on retrofits and monitoring: ABC helps businesses, universities, NGOs and individuals create effective monitoring programs and select the right solutions to reduce collisions.

Public education and outreach: A large part of ABC's collisions mission is raising public awareness about this issue. We connect people with solutions and provide detailed information to homeowners, architects, engineers, and lawmakers.

New initiatives: We are always working to improve bird-friendly window products while encouraging public action to reduce bird mortality rates. To keep up with our collisions program, you can sign up to receive email updates, or follow ABC on Facebook, Instagram, and Bluesky.

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Promoting Legislation in Your Community

Become a Collisions Advocate in Your Community

Legislation is an essential tool for speeding up the creation of a bird-friendly built environment. People working to reduce collision threats to birds soon realize how difficult it can be to convince a building owner to undertake a retrofit of an existing building or add bird-friendly features to a proposed structure. While strides can be taken to reduce threats at especially egregious structures, the most efficient use of your energy may be to ensure that future buildings will be designed to be bird friendly.

Passing legislation is a process that requires patience and perseverance. You must educate the community, recruit allies, understand the local political system and politicians, craft legislation with which the community is comfortable, work to get that legislation introduced and passed, and then work to ensure it is implemented successfully. This may seem like a lot, but passing legislation is doable and is certainly worth the effort, yielding long-lasting, wide-ranging results.

Step 1: Educate Yourself

Begin by making sure that you understand collisions well enough that you can explain the need for bird-friendly design and legislation, that you understand how the solutions work, and that you can confidently share this information and are able to answer questions about it. Start off by reading ABC's free Bird-Friendly Building Design book, Frequently Asked Questions, and the other resources on this site.

Next, create a presentation about the bird collisions problem and its solutions — or personalize ABC's free Powerpoint for your community (see <https://abcbirds.org/glass-collisions/resources/> and download "*Bird-window Collisions: A Summary in Seven Slides*"). Practice on your family and friends to become comfortable presenting the information.

Step 2: Recruit Allies

It is critical that your local community becomes aware that collisions are a real problem — and that there are readily available solutions.

An early step should be determining at which scale you want to work. In other words, where would you like to see legislation adopted? In a town, a county, or a state? Different strategies may be required for each, and each jurisdiction has influence over a different set of buildings.

A good start is to find out if any nearby areas have passed or are considering bird-friendly building legislation.

Next, offer to present your talk to anyone who will listen. Many groups have regular speaker programs and are eager for presenters. You might approach local wildlife conservation organizations, bird and garden clubs, museums, nature centers, reserves, zoos, universities, libraries, and senior centers. All are great places both to spread the word and look for active support.



Be prepared to deal with these questions:

- How do you know that bird collisions happen in this area?
- Will bird-friendly buildings be dark, with no light and no view?
- Will we have to give up creative design? Are bird-friendly buildings ugly?
- Will implementing bird-friendly design increase the cost of new construction?
- Will we need to hire and train new staff to implement the requirements?
- Will bird-friendly design interfere with sustainability goals for a building?
- ABC's Glass Collisions program's Frequently Asked Questions can help with the answers!

While talking to these groups, try to enlist them as supporters for your effort, whether or not you end up giving them a presentation. Let them know that, when the time is right, you would like them to contact officials on behalf of their organizations and use their networks to help create a groundswell of public support.

Look for media opportunities. Send an editorial to the local newspaper or newspapers, try to get media coverage relating to collisions during spring/fall migration or a collision monitoring group, or you could enlist a professional conservationist (university professor, nature center, etc.) to be interviewed.

Collisions legislation is much easier if you have a group of allies to build public support, act as sounding boards, share the work, and add insight and connections. A word of caution: Make sure that you speak with one voice from the start. The likelihood of success is reduced if local officials receive conflicting messages from the conservation community about what the legislation should do. (You can expect some opposition from developers – if possible, find one who is sympathetic to the cause to help with communication with this group.)

Step 3: Draft Your Legislation

Before you draft your legislation, fine-tune the details. Then, when you are confident of the tack you want to take, start writing. Ideally, you would propose that the legislation require that all new buildings be constructed entirely of bird-friendly materials. Unfortunately, such a proposition is not likely to pass. You can start with that, but be prepared to compromise, and decide where you think compromise is acceptable. This means being pragmatic and understanding if there is push-back. With this in mind, an important part of your plan should be an acceptable fallback position

For the specifics of drafting effective legislation, see the next section. Getting the wording right is crucial. If you would like help designing or editing legislation, please contact ABC's Glass Collisions team at collisions@abcbirds.org.

Step 4: Delve Into Politics

To start off, investigate the political system in your area of operation. Which decision-making body/bodies would have to approve bird-friendly legislation? What is the best way to position your legislation — as a code change, a law, a guideline, or something else?



Test the waters by discussing the issue with your local representatives. Do your best to get in-person meetings. Do not be discouraged if you have to send multiple emails or make multiple phone calls: Remember, persistence is often key in shaping policy. Also try to connect with groups that have successfully supported this kind of legislation in other regions. A list is provided here.

Try to locate all of the relevant committees and sub-committees, and try to learn about the interests and environmental records of individual legislators. This is critical, as you will need to enlist at least one legislator to sponsor the legislation. Eventually, your goal should be to make personal contact with all relevant decision-makers – and don't forget that legislators' support teams can be very influential and helpful.

Stay in touch with your elected officials (or the appropriate staffer) to discuss progress, how you can help them, and when a vote might be possible. And whenever the ordinance is discussed in session, have as many people there as possible to offer public comment, or to testify. This type of clear, vocal support makes a huge difference.

Once you have a proposed version of your legislation, create a letter of support that your partners can distribute through their networks, so that people can contact their elected officials to tell them how important bird-friendly buildings are to them. Strong support from constituents is great motivation for elected officials.

You might find yourself following our outline backwards, or doing multiple things simultaneously, depending on your community or even serendipity. If you know someone who knows someone, that can be a great place to start.



Writing Bird-Friendly Legislation

The Specifics of Bird-Friendly Building Ordinances

Bird-friendly legislation in the U.S. started in 2008 with then-local Congressman Mike Quigley's bill for unincorporated Cook County, Illinois (excluding Chicago). Since then, dozens of jurisdictions, from states to towns, have passed legislation.

Bird-friendly design ordinances generally include the same sections, including which structures are covered, how much of each structure must be bird-friendly, and how "bird-friendly" will be defined. Within these topics, however, there has been considerable variation. We have learned that while specifics may sound similar, they may actually be quite different — and there have also been unintended consequences. Below, we review each section and provide links to additional information, calculations, and other specifics.

ABC's Recommended Ordinance

American Bird Conservancy (ABC) has created a model ordinance (Appendix A) that can be quickly summarized as 100/100/100: **100% of new buildings should be built using 100% bird-friendly materials in the first 100 feet above grade.**

Many bodies and groups considering such guidelines will be interested in softening the language to exempt certain types of buildings or to reduce the amount of bird-friendly glass required in an effort to make compliance easier. If that is the case for you, we recommend beginning with our draft ordinance because it includes accurate definitions and the main issues to be considered, then revising it until it is acceptable.

Which Buildings Should Be Bird Friendly?

Most bird-friendly building legislation applies only to new construction. In some cases, it also includes renovations that change a significant portion of a building's glass. Historic and landmarked buildings are often exempted. No current legislation requires existing buildings to change glass that was not otherwise intended to be replaced (and this should not be a requirement, as it would be very expensive to do this).

Some options to consider including within bird-friendly building legislation include:

- a. Apply to all new construction, additions, and major retrofits. (See below for more on retrofit requirements.)
- b. Apply to a subset of new buildings. Legislation would only apply to buildings that meet some measure of height, floor or wall area, amount of glass area, or other variable. Because collisions are concentrated in the first 50-100 feet of all building types, this type of legislation exempts much of the most dangerous glass.
- c. Apply only to structures 'near' or within perceived priority bird areas. These can be green spaces and water bodies of certain sizes, habitat corridors, Important Bird Areas, etc. This strategy is problematic because birds are highly mobile, use even small green areas, and



fly from one area to another, passing dangerous glass along the way. It is unfortunately very easy to use a priority area clause to exempt a majority of hazardous buildings.

- d. Include high collision risk auxiliary structures and building structures and features. Auxiliary structures, including bus shelters, external hand rails, wind/noise barriers, gazebos, etc. also cause collisions. Certain building structures, like building connectors or sky walks, should be called out for extra attention because they can be collision hotspots. These are all hazards but are often omitted because they are not understood to pose a risk. They should be required to be bird-friendly no matter where they are found.

Should Guidelines Consider the Whole Building or Individual Façades?

You will have to decide whether your guidelines are applied to entire buildings or if buildings are first broken down into sections. There are two options:

- 1) Target the combined walls of a building (the "envelope") as a whole (e.g., 75% of the building envelope must consist of bird-friendly materials), or
- 2) Consider each façade (i.e., "side") separately (e.g., 75% of each façade must be bird friendly).

No matter which option is chosen, the guidelines will then require that a certain percentage or minimum area meet a bird-friendly threshold or standard (more below). The glass in the zone where birds are most active should always be the priority. Ideally, this would be from the ground to 100 feet, but most ordinances do not go this high.

Which of these options is chosen can impact how effective legislation will be, so pros and cons must be carefully considered, especially as other stakeholders in the project may have different goals and concerns.

It is better to create requirements for individual building façades than for entire building envelopes.

Targeting the envelope as a whole can be problematic without safeguards because this allows designers to stack all of the permissible non-bird-friendly glass into a single, dangerous area that may even be an entire side of the building.

An example illustrates the difference. Consider applying an ordinance that requires that 75% of the building envelope be bird friendly to a row of buildings. Such buildings frequently have three walls that are bird-friendly because they have little to no glass on the sides or back... but they then have a single large wall consisting almost entirely of dangerous glass. Using a building envelope approach of 75%, the three bird-friendly sides allow all of the non-bird-friendly materials to be stacked on a single, untreated side that poses a serious collision risk.

On the other hand, instead of applying to the building envelope, consider if the ordinance required that 75% of each façade were bird friendly. The three sides with little glass would still be bird friendly while the fourth all-glass side would then be required to use at least 75% bird-friendly glass, thereby doing a better job of meeting the spirit of the ordinance.

In some cases, people might argue that non-bird-friendly glass should be consolidated for an atrium or lobby. However, there are now highly effective bird-friendly glass options with patterns



that cover less than 7% of the glass, so it is possible to provide a bird-friendly atrium that uses glass, is heavily planted, and still has quality views to the outside.

Care should be taken that whatever is selected will work for the different types of buildings that will be covered.

Should Requirements Apply to Only the Glass or Consider Glass as One of Many Building Materials?

Another question is whether the glass is considered separately or as one material among others comprising the envelope. It makes a big difference whether you require that 75% of the glass to be bird friendly vs. requiring that 75% of the envelope be bird friendly.

Requiring a percentage of the glass is always safe because you ensure that the glass itself must be bird friendly. On the other hand, requiring a percentage of the envelope to be bird friendly can mean that no glass needs to be bird friendly.

Consider guidelines requiring at least 75% of a building to be made of bird-friendly materials. This means that 75% of the building can be made of stone, wood, brick, and any materials that are not a collision threat, while the remaining 25% is exempted, even if dangerous reflective glass. While this is certainly better than a building that is 50% or 75% dangerous glass, that 25% can still cause a lot of collisions and would be much better if it were bird-friendly. If, on the other hand, the requirements stated that 75% of the glass must be bird friendly, then even in a building with only 25% glass, the majority of it must be made bird friendly.

Also take into consideration that your selection here interacts with the other decisions that you make, such as selecting the building envelope or individual façades.

Will You Exempt Panes of Glass Under a Certain Size?

Another important question to answer is whether there is a maximum allowable area for a single pane of non-bird-friendly glass. In other words, does your ordinance state that pieces of glass under a certain size do not have to be bird friendly?

There is no easy answer here because even small panes of glass can be a threat to birds. The small birds that are the most frequent collision victims can and will fly through very small spaces. So, while smaller panes are safer, they alone are not sufficient to prevent collisions— especially when many small panes are placed side-by-side, without mullions.

Several cities have settled on 20 ft² as a threshold under which glass will not have to be bird friendly (a typical sliding glass residential door is 35-40 ft²), but that is still a huge piece of glass for a bird with a seven-inch wingspan. This also excludes essentially all home windows, where almost 50% of collisions occur. For homes, most small areas of glass can easily be made bird friendly by installing external insect screens, but this is not usually a solution for larger structures with glass curtain walls.

The best answer here is to include all glass regardless of pane size and, if a pane-size threshold must be included, to make it as small as possible.



All glass, even if it is insulated, transmits heat more readily than do other façade materials. When glass represents above 20- 40% of the envelope, depending on climate, heating and cooling costs start to rise significantly, making the building less sustainable and more expensive to operate. So, make sure you start by discussing energy efficiency and then talk about making the remaining glass safe for birds.

How Will Bird-friendly Materials Be Defined?

There are several ways to define acceptable materials. Some legislation includes multiple options to allow architects the freedom to design novel solutions, while making it easy to find a simple product for a minor job.

ABC defines bird-friendly materials as those with a Material Threat Factor less than or equal to 30. All commercially available materials with Threat Factors can be found in our database of Products and Solutions.

In Canada, some jurisdictions specify that bird-friendly patterns must be on the outside of the glass, on "side 1." Side 1 materials are preferred because on the outside, surface reflections will not obscure most patterns.

"Prescriptive" options provide a set of criteria, based on existing research, that define acceptable glass, including spacing, opacity, color, orientation, and minimum dimensions of pattern elements, along with surface reflectivity, glass color, and presence of coatings. Pattern elements (lines, dots, etc.) should have no more than 2" separating them with solid lines at least 1/8" diameter and non-lines at least 1/4" in diameter. Remember that external structures like screens and louvers should be included as possible solutions. ABC's prescriptive criteria can be found at abcthreatfactor.org.

Common Ways to Restrict the Number of Buildings

Often, existing legislation does not apply to all buildings but instead to a subset of new buildings. The subset is frequently defined by, for example, building height, floor area, amount/size of glass, proximity to parks, zoning status (e.g., commercial/residential), or other characteristics or classifications.

Exempted buildings can still cause a lot of collisions because glass is frequently concentrated on the lower floors, where it is most dangerous for birds, and all glass on low-rise buildings is in the primary collisions zone. In fact, buildings under 12 stories tall account for over 99% of collisions, so effective guidelines should not be designed to exempt all but the largest buildings.

Here we take a brief look at examples of common thresholds used to limit the number of buildings included in bird-friendly legislation.

Some guidelines only apply to buildings that exceed thresholds for building size or the amount of glass — for example, buildings with a gross (i.e., total) floor area over a certain number of square feet (e.g., 10,000 ft²) or percentage of glass on a façade (e.g., 50%). Such limits might sound reasonable, but they essentially serve to exempt small- to medium-sized buildings and buildings that are not entirely glass, no matter their size.



Consider two examples:

First, a typical three-story (~30'-tall) building with a 50 ft x 50 ft footprint. This building has a gross floor area of 7,500 ft² and the entire façade is in the primary collisions zone. Under a 10,000 ft² gross floor area threshold, this building would be exempt from bird-friendly building guidelines even if built of 100% reflective glass.

Second, a 10-story (~100 feet) building with a 150 ft x 150 ft footprint. The total façade area (i.e., building envelope) of this building is 60,000 ft². If legislation applies only to buildings with over 50% glass, this building would be exempt from design requirements as long as it had less than 30,000 ft² of glass. However, even guidelines that only encourage designers to use less can be positive for birds because they will reduce the total amount of glass in the environment.

These types of exemptions are not what most people have in mind when they advocate for bird-friendly building design requirements. Restrictions like these falsely imply that only large, all-glass buildings are a threat to birds. Bird-friendly building guidelines will be most effective if they focus on the lowest floors of all building.

How "Major" is a Major Renovation?

Legislation that applies to new construction (which should include additions), may also include "major renovations." Predictably, and not unreasonably, there will be concern that a small project, or simply replacing a single window, might trigger the need for a building to comply with the legislation. This should not be the case, and clarity is needed: It is therefore important to specify that in existing building renovations, only major glass replacements fall under bird-friendly guidelines.

Including renovation requirements might not seem worth the trouble, but glass and glass assemblies fail and eventually need to be replaced. Communities are also adopting more stringent greenhouse gas emission limits for buildings, targets that might not be able to be met without new glass. So, there is significant potential to address collisions at existing buildings over time through a major renovation clause. This is important, as legislation in general does not apply to existing glass.

When defining what constitutes a "major renovation," keep in mind that renovation requirements will only be triggered for buildings that meet your legislation's other thresholds for inclusion. Consider using language such as: "Renovations that add new glass or replace >25% of existing glass." Historical and landmarked buildings might be exempted, but most of these do not have much glass.

Proximity to Bird Habitat

Some existing legislation only applies to buildings within a fixed distance of a green space of a certain size, or some other measure of bird habitat.

These restrictions are problematic because birds are highly mobile. They use street trees and small patches of vegetation in the built environment, spending time in close proximity to buildings. They also fly from one habitat patch to another, passing buildings along the way. These



movements in built environments create collision risks throughout urban areas, as has been documented by window collision monitoring groups in the United States and Canada.

The best choice here is not to restrict bird-friendly design only to areas in close proximity to what is perceived as prime habitat because birds do not restrict themselves to these areas.

How High up the Building Façade Should Bird-Friendly Materials be Required?

While we have documentation of collisions several floors above the 10th floor (i.e., about 100 feet above grade), research shows that collisions tend to be most frequent in areas where glass reflects vegetation. This suggests that the priority area for bird-friendly building guidelines should be the average height of the local tree canopy, perhaps adding as much as 50% – 100% to account for birds flying above trees. This zone is where birds spend most of their time. Guidelines generally range from 40 feet to 75 feet. ABC's model ordinance suggests 100 feet. Basically, the higher up the building you go, the more birds you will save!

Which Auxiliary Structures and Features Should Always be Bird-Friendly?

There are many auxiliary structures and features that are notorious for causing collisions and should never be built out of anything but bird-friendly materials.

In other words, these structures and features should be bird friendly no matter where they occur within a building or as free-standing structures. To view a full list of these features, visit ABC's Model Ordinance.

High-Risk Auxiliary Structures: Structures that pose significant collision risks to birds wherever they are found. For example:

- 1) Transparent or highly-reflective:
 - a. Railings, including balconies
 - b. Noise barriers
 - c. Wind barriers (including parking structures)
 - d. Transportation (e.g., bus stops) or weather shelters
- 2) Small, stand-alone buildings that present conditions that can be both transparent and reflective and are often located in bird flight paths:
 - a. Gazebos
 - b. External ticket booths
 - c. Any other free-standing glass, plexiglass, or other clear, transparent, or highly reflective free-standing structure, including decorative objects.
- 3) High-risk building features: Certain building features are frequently collision hotspots and should always receive special attention, including:
 - a. Skyways/skywalks
 - b. Building connectors, no matter the number of floors
 - c. All outside corners where a bird can see in one side of the building and out the other within 30 feet of the corner.



- d. All convex corners within 30 feet of the corner
- e. Parallel glass walls \leq 50 feet apart
- f. Courtyards, including internal atria,
- g. Atria
- h. All glass up to 3 stories above green roofs.

Quality View Requirements

Some municipalities have quality view rules that require transparent ground-level windows. The good news is that most types of bird-friendly vision glass provide a quality view, with patterns that prevent collisions covering less than 7% of the glass. There are also a handful of bird-friendly glass products that create patterns in ultraviolet light that some (but not all) birds can see and people cannot, so quality view requirements need not conflict with bird-friendly glass.

Should Green Roofs be Included?

Glass adjacent to green roofs is frequently included in bird-friendly glass requirements, regardless of a building's height or size. These roofs attract birds, even in the most urban settings, so including green roofs in legislation is a good idea.

There are a variety of green roof types, from those with short plants like sedges and grasses to a few that can even have trees up to 40 feet tall, although 10- to 15-foot-tall trees are most common. As with vegetation on the ground floor, any glass that is next to one of these roofs will be a collision threat. Green roofs should be included in legislation, even if they are not common yet. All glass adjacent to green roofs should be bird friendly to at least 30' above the roof surface.

Vision and Non-Vision Glass

Vision glass is generally thought of as glass through which people can see the outside world from inside a building. However, this is not the only type of glass that poses a threat to birds. Building exteriors frequently consist of 50% or more of non-vision glass, which is referred to as spandrel glass. People are not able to see through spandrel glass, which often has an opaque inner surface.

Think of an all-glass building — there are wires, spaces between rooms and floors, and many other building materials that might be visible from outside. These are hidden by spandrel glass. This glass can be just as deadly to birds as vision glass, so it should always be included in bird-friendly building guidelines by simply using the word "glass" or "glazing" without specifying a type.



Existing Bird-Friendly Building Legislation

When writing bird-friendly building legislation, ABC recommends starting with our Model Ordinance (Appendix A) and Guide to Writing Legislation. In addition to focusing on the resources that we have created to help you, it can be useful to survey existing legislation and guidelines. We are listing these below.

ABC's legislative goal is to ensure that bird-friendly building design standards are applied to as many buildings and as much glass as possible. None of the existing legislation and ordinances evaluated below goes as far as ABC's Model Ordinance for two reasons:

- 1) Politics require making compromises, and
- 2) Many ordinances were modeled on early ordinances that were less stringent. Below, you will see language, common features, and the types of exemptions and restrictions that have been included in existing legislation. We hope your legislation will one day be added to this growing list.

The ordinances and codes below are split into categories based on ABC's assessment of their overall effectiveness. Links are provided to the full language from the official site of the pertinent governing body. As many of the government code source documents are hundreds of pages long, here we have included only the relevant portions. If you would like to view the full text, please visit the governing bodies' websites.

If you decide to delve into the legislation available, we recommend reviewing the "Recommended" and ""Recommended with Reservations" ordinances below. On our website we have the full list, including the "Not Recommended" category at <https://abcbirds.org/glass-collisions/existing-ordinances/>.

We strongly believe that the most direct route to drafting a good set of guidelines is to start with the full text and definitions of the ABC Model Ordinance and modify as necessary.

In the event that you borrow language from any of the existing ordinances listed below, ABC highly recommends using the definition of bird-friendly glass (and all other definitions) found in our Model Ordinance because they provide the largest number of bird-friendly materials.

Recommended

General Services Administration P100 Facilities Standards (original 2022, updated 2024) [Link](#)

- Mandatory. Applies to new construction and major alterations that affect the building envelope of buildings owned by the GSA. Glass up to 75 ft. above grade and 3 floors above green roofs must have an ABC Threat Factor of 30 or less. Glass corners, fly-through areas, railings, and other hazardous structures must have a TF of 25 or less.
- Comments: The standard would be stronger if it included glass to 100 ft. above grade.

Washington, D.C., U.S.A. (2022) [Link](#)

- Mandatory. Applies to commercial buildings, District-owned buildings, and multi-unit housing complexes that are new or have 75% or more exterior glass replaced. Requires bird-friendly materials, defined as materials with a maximum Threat Factor of 30, up to



100 ft. such that non-bird-friendly materials do not exceed an aggregate 10 ft.² in any 10 ft. by 10 ft. area. All corners and fly-through features up to 100 ft. above grade and all glass 24 ft. above a green roof or terrace must be bird-friendly.

- Comments: The standard would be improved by including buildings that are replacing 25% or more of the exterior glass.

New York City, NY, U.S.A. (2019) [Link](#)

- Mandatory. Local Law 15 of 2020 requires that at least 90% of the glass in the first 75 ft. above grade must be bird friendly for all new buildings in the City of New York, from houses to skyscrapers. Covers auxiliary structures and includes requirements for hazardous features.
- Comments: The standard would be strengthened if it included glass to 100 ft. above grade and 100% of glass on the façade.

Mountain View, CA, U.S.A. (2017) [Link](#)

- Mandatory. Applies only to the North Bayshore area. All new buildings, additions, and alterations should use bird-friendly materials for 90% of the façades up to 60 ft. Includes requirements for lighting and for treating hazardous features. See pages 125-126 in the pdf for the text.
- Comments: The standard would be stronger if it included glass to 100 ft. above grade and 100% of glass on the façade.

Toronto, Ontario, Canada (2010) [Link](#)

- Mandatory. Guidelines that apply to: a) all industrial, commercial, and institutional development, b) residential development ≥ 4 stories, and c) low-rise residential development near natural areas. 85% or more of all exterior glazing, and all hazardous features, must be bird friendly up to 12 m above grade.
- Comments: Including glass to 100 ft. above grade, 100% of glass on the façade, and residential under 4 stories would strengthen it.

Recommended with Reservations

Lake County, IL (2024) [Link](#)

- Mandatory. All new non-residential buildings and renovations/additions involving glass are required to have 80% bird friendly glass (TF \leq 30) to 100 ft. above grade. Includes glass adjacent to green roofs, landscaped areas, and accessory structures.
- Comments: The standard would be stronger if it required 100% of glass to be bird-friendly and residential construction, or had a mechanism to ensure that the 20% non-bird-friendly glass is not in an unbroken mass on the lower floor where it would present a major hazard.

Middleton, WI, U.S.A. (2024) [Link](#)

- Mandatory. Buildings over 10,000 ft.², where first 60 ft are $> 50\%$ glass, 85% of glass and all glass within 15 ft. of corner fly-through conditions must be treated. Spandrel less than 14% reflectivity not included in glass area calculations. Buildings where first



60 ft. are < 50% glass then 85% of glass on areas > 50 ft.2. must be treated. Glass railings and building connections must be treated. All sky bridges, and sound walls or glass screens must be treated on buildings of any size Treated is defined as 1/4" dots or 1/8" lines with 2x2" spacing, low reflectance opaque materials, non-glass double skin facades, screens, metal screens or solar shading, and allows zoning administrator to approve other mitigation options.

- Comments: Could be strengthened by including requirements for smaller buildings and green roofs while also prohibiting large expanses of non-bird-friendly glass.

Portland, ME, U.S.A. (2024) [Link](#)

- Mandatory. Requires bird-friendly materials with a Threat Factor of 30 or less to be used on the first 75 ft. of new or renovated buildings 10,000 ft.2 in floor area or larger. Allows non-bird-friendly materials to be used as long as they do not exceed 10 ft.2 in aggregate in any 100 ft.2 area. Exempts residential buildings, operable sash windows, and ground floor glazing of retail, bars, and restaurants.
- Comments: This could be strengthened by reducing the threshold for applicability to less than 10,000 ft.2, increasing the number of buildings to which it applies, including residential buildings and eliminating the ground floor retail and sash window exemptions.

Berkeley, CA, U.S.A (2023) [Link](#)

- Mandatory. Requires bird-safe materials on all new non-residential buildings and when glass is replaced on existing buildings up to 75 ft. above grade and on all "high-risk" features (e.g. railings, glass walls, skywalks etc.) Also applies to residential or mixed-use buildings $\geq 10,000$ ft.2. Bird-safe material include those with an ABC Threat Factor ≤ 30 or following prescriptive criteria. Include phase-ins for "lower hazard" buildings (every façade has < 30% glass area) and exemptions for affordable housing.
- Comments: Including buildings < 10,000 ft2 would strengthen this code.

LEED Innovation Credit: Bird Collision Deterrence (2009; updated 2023) [Link](#)

- Private Guidelines. An optional Innovation Credit in the US Green Building Council's LEED program. It can be adopted as an ordinance to cover any/all buildings. It requires that a building have a total building Bird Collision Rating (BCR) of ≤ 15 . BCR is a weighted average that estimates collision risk for the total building envelope, where lower sections — Façade Zone 1, which is ≤ 40 ft. above grade and ≤ 12 ft. above green roofs — have more weight than the materials above that (Façade Zone 2 is $>40 \leq 100$ feet above grade). Includes requirements for lighting, post-construction monitoring, and addressing hazardous features.
- Comments: The credit could be improved by removing the BCR and mandating bird friendly glass to 100 ft above grade. *Note that as of January 2025 the LEED credit is in the process of being revised.

Evanston, IL, U.S.A (2022) [Link](#)

- Mandatory. Applies to "all planned developments, new commercial, multifamily and industrial construction projects and renovation projects of an existing building that includes the replacement of 100% of the exterior glazing." Exempts single family



homes, duplexes, townhouses, and residential structures ≤ 3 stories. Compliance requires a Building Collision Threat Rating dependent on building section and “risk zones.” Projects that meet the LEED Bird Collision Deterrence credit are considered compliant. A second compliance option allows the use of permanently affixed sunshades, shutters, or screens, in lieu of a calculated BCTR.

- Comments: The standard would be improved by including buildings that are replacing 25% or more of the exterior glass, residential structures under 3 stories. For the LEED credit option the same improvements apply: removing the BCR and mandating bird friendly glass to 100 ft above grade.

Cupertino, CA, U.S.A (2021) [Link](#)

- Mandatory. Requires bird-friendly materials and lighting for new construction, renovations, and replacement glass windows, doors, and exterior lighting fixtures. Exempts residential development in R1 zoning, first-floor storefronts, and historic buildings unless those buildings fall within a “Bird Sensitive Area.” 90% of glazing must be treated up to 60 ft. and 95% of glazing must be treated above 60 ft.; all hazardous features (skywalks, balconies, corners, etc.) must be treated with visual cues that reduce the likelihood of collisions. Lighting regulations include down-shielded fixtures, warm color-spectrum ($\leq 3000\text{K}$) lighting, and motion sensors.
- Comments: This could be strengthened by removing the exemptions in all areas, not just those designated “bird-sensitive.” Birds move throughout the built environment between habitat spaces and are vulnerable to collisions everywhere glass is present. Could also be strengthened by including a Threat Factor threshold definition of bird-friendly materials.

Illinois (State), U.S.A (2021) [Link](#)

- Mandatory. Applies to State-owned buildings that are newly constructed, acquired, or have renovations altering $> 50\%$ of the façade. Requires bird-friendly materials, defined as materials with birds-friendly elements, 2 by 4-inch UV or visible patterns, or opaque glass (does not indicate a Threat Factor threshold), to be used on $\geq 90\%$ of the façade up to 40 ft. and 60% of the façade above 40 ft. Transparent corners and passageways are not allowed, and all glass adjacent to courtyards and atria must be bird-friendly. Includes a provision to “appropriately” minimize and shield outdoor lighting barring security and mission-related requirements.
- Comments: Could be strengthened by requiring a higher percentage of bird-friendly materials above 40 ft. and defining an acceptable Threat Factor for materials.

Wisconsin (State), U.S.A (2021) [Link](#)

- Mandatory. Requires State-owned new construction and renovations with more than 20% glass facades to incorporate bird-collision deterring strategies on 80% of the façade up to two stories or to the tree canopy, whichever is higher. Includes glass adjacent to green roofs. References ABC Bird Friendly Building Design Guide for strategies.
- Comments: Would be improved by 1) including buildings with less than 20% glass facades as smaller amounts of glass can still be deadly and 2) by defining ‘bird-collision deterring strategies’



Canadian Standards Association (CSA), Canada (2019) [Link](#)

- Model. Model guidelines for all buildings that provinces can adopt into code. Use >90% bird-friendly glazing to 16 m above grade and 4 m adjacent to a green roof — or to the height of the mature tree canopy — whichever is greater. The CSA specifies but does not define “high contrast” for markers.
- Comments: Based on available data, the minimum marker sizes specified are too small (4 mm) and should be increased. The CSA also requires surface-one treatments, but at present this requirement limits available materials and should be expanded to include effective surface two treatments. The standard should also define marker contrast and opacity.

Emeryville, CA, U.S.A. (2020) [Link](#)

- Mandatory. Applies to all new construction and window replacements. For areas of contiguous glass of ≥ 12 ft.2, $\geq 90\%$ of the glazing on any façade or glass structure, and all glass near plants or water features, must be bird friendly. Includes lighting requirements.
- Comments: Removing the 12 ft.2 contiguous glass trigger would make this much more effective.

Madison, WI, U.S.A. (2020) [Link](#)

- Mandatory. Applies to buildings with >10,000 ft.2 of total above-ground floor space: For façades with >50% glass in the first 60 ft. above grade, 85% of the glazing must be bird friendly, along with all glazed corners; façades with <50% glass in the first 60 ft. above grade must treat >85% of glass areas >50 ft.2 along with all glazed corners. Includes hazard features.
- Comments: Ideally this would be adopted without the 50 ft.2 exemption and would include more buildings by reducing the building square-footage threshold.

Minnesota (State), U.S.A. (2013) [Link](#)

- Mandatory. Applies to state-owned new buildings and major renovations. Whole-building Threat Factors, which are analogous to the weighted average calculation for LEED Innovation Credit for Bird Collision Deterrence, are used to define requirements (non-critical sites = 45; critical sites = 15). Includes hazardous features and lighting. See especially pages 6-7 and 57-66.
- Comments: Could be improved by removing the weighted calculations and critical/noncritical designations and mandating bird-friendly materials to 100 ft.



Case Studies

In the absence of Federal legislation, cities across the country are stepping up as leaders in implementing bird-friendly building policies. “Building Safer Cities for Birds: How Cities Are Leading the Way on Bird-Friendly Building Policy” published by the Yale Law School's Law, [Ethics and Animals Program](#) and the American Bird Conservancy highlights the progress and potential of local laws in mitigating bird collisions, showcasing successful case studies from cities like New York, San Francisco, and Arlington.

You can read the press release [here](#) and download the full report at <https://abcbirds.org/wp-content/uploads/2023/08/2023-Yale-Report.pdf>

Additional Resources

Bird-window Collisions: A Summary in Seven Slides (2024)

Available at <https://abcbirds.org/glass-collisions/resources/>, this short PowerPoint presentation give a brief overview of why birds collide with glass and how to prevent it. This slide deck can be customized for presentations to leaders and potential advocates in your community.

Glass Collisions and Light Bibliography (2024)

Available at <https://abcbirds.org/glass-collisions/resources/>, this is a comprehensive bibliography of scientific literature covering both bird-window collisions and the effect of artificial light at night on birds. It is updated yearly.

Preventing Bird Collisions with Glass: A Retrofit Solutions Handbook (2023)

Available at <https://abcbirds.org/glass-collisions/resources/>. A product of a partnership between American Bird Conservancy and National Park Service, this handbook provides an overview of retrofit solutions available for both homes and commercial buildings.

About the ABC Rating System

Available at abcthreatfactor.org. We recommend ABC Threat Factors as an option to define acceptable materials in bird-friendly legislation. Learn more about ABC Threat Factors and how we assign them here. This document also includes ABC's prescriptive criteria.

ABC Staff

The ABC Collisions Team is available to support your efforts! We can give virtual presentations, attend briefings with legislators, submit testimony, and more. Please don't hesitate to reach out at collisions@abcbirds.org



Appendix A. ABC Model Ordinance

This model ordinance is also available for download as a Microsoft Word document at <https://abcbirds.org/glass-collisions/resources/>

American Bird Conservancy Model Bird-Friendly Building Guidelines

October 2023

These model guidelines are intended to be a starting point for cities, towns, villages, counties, states, universities, businesses, and any other entity interested in regulating or guiding building construction to reduce bird collisions with glass. They describe a truly bird-friendly building.

Summarized simply, these guidelines are based on a 100/100/100 framework: 100% of all glass and other building materials should be bird friendly in the first 100 feet of 100% of buildings. The guidelines also specifically include making bird friendly all hazardous features and materials that cause collisions no matter where they are found.

Any group that adopts these guidelines as written will be at the leading edge of creating a bird-friendly built environment. However, many groups considering such guidelines will be interested in softening the language to exempt certain types of buildings or to reduce the amount of bird-friendly materials required. In anticipation of this, American Bird Conservancy (ABC) has created a discussion of the issues to be considered when revising this model (see [ABC's Legislation, Ordinances, and Codes](#)).

This model will be most commonly adopted as an ordinance to modify municipal building codes and is therefore written in that format. However, the text can be easily adapted to fit other building guidance formats.

ABC will revise these guidelines as new science, materials, techniques, and technologies become available, so please make sure that you have the most current version before you begin the process of creating your own guidelines. The most recent version can be found on ABC's website (see [ABC's Legislation, Ordinances, and Codes](#)).



PROPOSAL NUMBER:

PROPOSAL NAME: Bird-Friendly Building Design Requirements

SPONSOR(S):

PURPOSE: This building ordinance has been created to address the role of the (*MUNICIPALITY*)'s built environment in the annual loss of up to 1 billion birds due to glass collisions in the United States.

WHEREAS, birds provide valuable and important ecological services,

WHEREAS, (*MUNICIPALITY*) has recorded (*XXX*) species of resident and migratory bird species,

WHEREAS, birding is a hobby enjoyed by 46 million Americans with an annual \$107 billion total industry output in the United States,

WHEREAS, as many as 1 billion birds may be killed by collisions with windows every year in the United States,

WHEREAS, new buildings can be designed to reduce bird deaths from collisions without significant additional cost,

WHEREAS there exist strategies to mitigate collisions on existing buildings,

WHEREAS witnessing a collision is an upsetting, sad event,

WHEREAS no person wants to live or work in a building that kills wildlife,

WHEREAS façades with more than 30% glass usually increase costs and CO2 emissions from heating and cooling,

WHEREAS, bird-friendly practices can go hand-in-hand with energy efficiency improvements,

And **WHEREAS** (*ANY ADDITIONS SPECIFIC TO THE MUNICIPALITY*),

NOW, THEREFORE, the (*LEGISLATIVE BODY*) of the (*MUNICIPALITY*) does hereby ordain as follows:

1. Section (*XX.XXX*) of the (*MUNICIPALITY*)'s General Ordinances is created to read as follows:
 - a. DEFINITIONS
 - i. Glass: All glass, including spandrel glass.
 - ii. Reflective and/or Transparent Non-Glass Materials: Any non-glass materials that are transparent or highly reflective, including but not limited to plexiglass and polished metal.
 - iii. Bird Activity Zone: The zone between 0 and 100 feet above grade.
 - iv. Auxiliary Structures: Structures that pose significant collision risks to birds wherever they are found, including but not limited to:
 1. Transparent or highly-reflective:
 - a. Railings, including balconies
 - b. Noise barriers
 - c. Wind barriers (including in parking structures)



- d. Transportation or weather shelters, including both private and public bus and train stops
 - 2. Small, stand-alone buildings that present conditions that can be both transparent and reflective:
 - a. Gazebos
 - b. External ticket booths
 - c. Any other free-standing glass, plexiglass, or other clear, transparent, or highly-reflective free-standing structure
- v. High-Risk Building Features:
 - 1. Skyways/skywalks
 - 2. All floors of building connectors
 - 3. All outside corners where a bird can see in one side of the building and out the other (“fly-through conditions”) within 30 feet of the corner
 - 4. All interior corners within 30 feet of the corner
 - 5. Glazing adjacent to courtyards
 - 6. Atria, open and enclosed
 - 7. Three floors of glazing adjacent to any green roof or partial green roof
- vi. Major Renovations and Additions Involving Glass: Any renovation in the Bird Activity Zone that:
 - 1. Replaces at least 25% of a structure’s existing glass or other transparent or reflective materials, or
 - 2. Adds any new glass or transparent or reflective materials
- vii. Bird-Friendly Glass: Glass or materials that meet any of the following conditions:
 - 1. Any product with an American Bird Conservancy Material Threat Factor Rating ≤ 30 . Visit birdsmartglass.org to view the continuously-updated database
 - 2. Any product that follows [American Bird Conservancy's Prescriptive Rating Criteria \(abcthreatfactor.org\)](http://American Bird Conservancy's Prescriptive Rating Criteria (abcthreatfactor.org))
 - 3. Glass with exterior surface (surface 1) obstructed and effectively covered by building-integrated structures that do not have gaps larger than 12" in any dimension, including non-glass double-skin facades, metal screens, fixed solar shading, exterior insect or solar screens, and other features as determined by the (BUILDING DEPARTMENT OR SIMILAR) that meet these conditions.
 - 4. Continuous-surface materials, including spandrel glass and polished or brushed metals, whose surface 1 gloss reading follows the [ABC Prescriptive Rating Criteria \(abcthreatfactor.org\)](http://ABC Prescriptive Rating Criteria (abcthreatfactor.org)) to ensure that they do not produce strong reflections).

b. REQUIREMENTS

- i. 100% of the glazing for all building types must be Bird-Friendly Glass for the following projects:
 - 1. All new construction in the Bird Activity Zone.
 - 2. Major Renovations and Additions Involving Glass and Reflective and/or Transparent Materials in the Bird Activity Zone.



3. All Auxiliary Structures regardless of whether the rest of the building or project triggers these bird-friendly building requirements.
4. All High-Risk Building Features regardless of whether the rest of the building or project triggers these bird-friendly building requirements.

