

## CONSIDER INTERIOR AND EXTERIOR TREATMENT



An exterior ceramic framework provides shading and daylighting (New York Times)

**Exterior shading** or other architectural devices enhance bird safety.

- Utilize shading devices, screens, and other physical barriers to reduce reflectivity and birds' access to glass.
- Incorporate louvers, awnings, sunshades, light shelves or other exterior shading/shielding devices to reduce reflection and give birds a visual indication of a barrier.
- Consider other highly patterned shading/shielding devices that will provide visual cues and encourage bird safety.

**Interior window treatments** can provide visual cues for birds and reduce both transparency and reflections. They also help reduce light trespass from buildings. See "Building Operations" page 26.

- Design interior window treatments using light-colored solar reflective blinds or curtains. Partially open blinds during the day.
- Close curtains and blinds if evening lighting is utilized.
- For best results, consider photo-sensors, timers and other automatic controls to regulate shading devices, lighting and daylighting.

## CONSIDER INTEGRATED DAYLIGHTING



Translucent glass can help balance daylighting and prevent bird collisions

Large expanses of clear exterior glazing do not equate to effective daylighting for buildings. In fact, over-glazing can contribute to glare, veiling reflections, unwanted heat gain, and also bird collisions. Many strategies used to achieve effective daylighting are compatible with bird safety.

- Where appropriate, daylighting strategies such as exterior shading devices, fritted glass, and diffuse and translucent glass can also help to prevent bird collisions.
- In general, the more untreated glass you have, the greater the risk to birds, especially on sites that are in predictable migratory and resident bird areas.

### WINDOW AREA

Windows constitute about 25-40 percent of the wall area of effectively designed daylit buildings, an area very similar to the windowed area in non-daylit buildings.<sup>20</sup>

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EQ 8.1 and 8.2 Daylight & Views  
EA 1 Optimize Energy Performance

# Emerging Technologies

**OBJECTIVE:**

*Encourage glass manufacturers to advance the search and development of innovative technologies that make glass visible to birds without visually impairing glass for humans.*

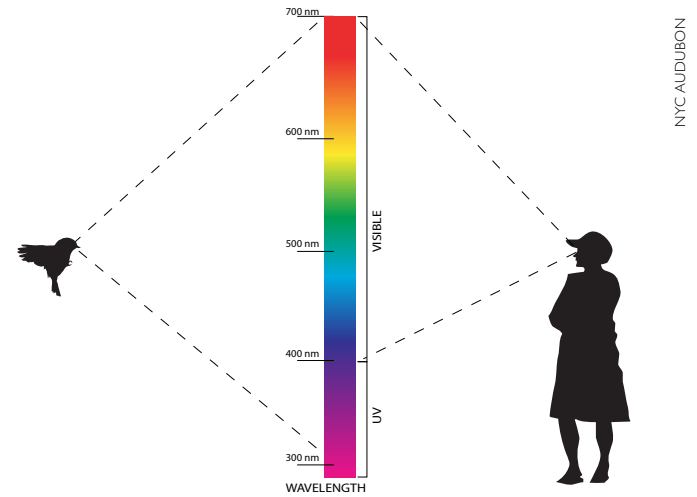
THE ARCHITECTURE AND BUILDING DESIGN INDUSTRY is perhaps best positioned to press for long-term technological solutions for bird-safety. Encouraging a technological solution would stimulate research and development in the glass industry, and encourage wide-ranging innovative product development with beneficial economic consequences.

An innovative technological solution would be widely accepted in the design and construction industry, with beneficial economic consequences, particularly if it minimized aesthetic impacts and was cost-competitive. Developing effective technologies will require commitment of time and resources along with the support and leadership of glass and construction industry officials.

**CONSIDER INNOVATION**

Bird-safe glass may involve novel uses of known manufacturing processes, new/unexplored technologies or even the use of polycarbonates. Designers and architects can create demand for bird-safe technology that has stalled in development due to an uncertain market for these products.

- Encourage manufacturers to offer “bird-safe” patterns as stock products in a variety of finishes for design flexibility (i.e. ceramic frit, acid etching, laminated LEDs, electrochromic coatings).
- Encourage the development of glass that eliminates reflections. The exterior surface of glass is of primary concern, however all surfaces of glass reflect habitat to some extent.
- Request plastic films, diachronic coatings, and tints for exterior use.
- Utilize existing patterning materials such as ceramic frits and acid etching for exterior use.
- Support research on pattern recognition of both humans and birds to identify patterns that inhibit the fly-through effect while minimally obstructing human views.



Differences in human and avian vision have inspired one type of bird-visible glass – Ornilux Glass – and much ongoing research

ROBERT BLEWISS, PROCEEDINGS OF NATIONAL ACADEMY OF SCIENCES



Human-visible



Bird-visible

**DID YOU KNOW?**

Unlike humans, birds perceive UV light as a separate color. In fact, many birds have feather patterns that are invisible to humans. These patterns help birds distinguish among species and sexes. UV vision is also important for feeding and for orientation during migration. Glass products that either reflect or absorb UV wavelengths are being tested for bird safety but are not yet readily available.<sup>21</sup>



## CONSIDER NEW TECHNOLOGY



CHRISTINE SHEPPARD

Ornilux Glass was recently installed at the Wildlife Conservation Society's Center for Global Conservation in Bronx, New York

The development of an integral glass technology would greatly reduce the problem of building-related bird mortality without imposing major aesthetic modifications to contemporary building designs.

- Develop glass with integral patterns in the ultra-violet range that will be visible to birds and not humans.<sup>21</sup>
- Experiment with particles that can be cast integrally into glass during the production process.
- Encourage the development of other forms of non-reflective tinted or spectrally selective glass.

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ID 1 to 1.4 Innovation in Design

### Research and New Product Development

The need for readily-available, cost-effective and aesthetically acceptable products that effectively deter birds from windows cannot be overstated. Existing products and strategies, while developed for other purposes, have great bird-safe potential and have, in some cases, been used intentionally as such.

Still there remain few materials specifically developed for this purpose as industry demands have not pushed manufacturers to meaningful action. It is hoped that ongoing research along with collaboration between architects, glass/film manufacturers and bird conservation professionals will yield new products in the near future.

Ornilux Glass (left) is currently the only commercially available glass product being marketed as “bird-friendly.” A UV striped pattern on the inside of the glass increases glass visibility for birds while remaining relatively unobtrusive for people.

Many consider UV coated glass and films to be an ideal solution because of their potential to deter birds while leaving the appearance of glass largely unchanged. Recent research by Dr. Daniel Klem of Muhlenberg College explored the use of a window film with alternating UV reflecting and absorbing stripes and found it highly effective as a deterrent to collisions.<sup>22</sup> Ongoing work in Austria by Martin Roessler has focused on finding which patterns, when applied to glass, are most effective in deterring birds while simultaneously requiring the least coverage.<sup>23</sup>

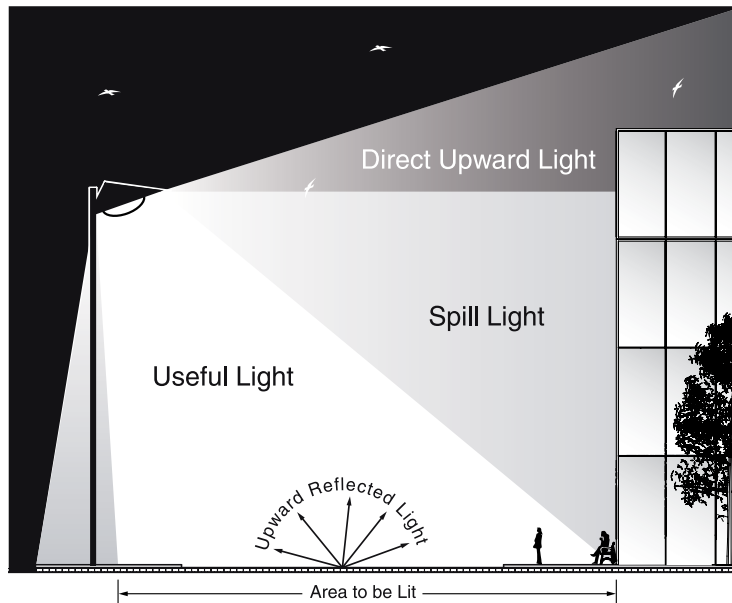
In the end, the development of effective bird-friendly products requires the will on the part of building designers, owners and managers to demand and test new and existing materials in real-life conditions. A number of inspiring case studies exist (see pages 32-36) and ongoing work with glass and film manufacturers may soon yield readily available products that satisfy both birds and people.

# Lighting Design

**OBJECTIVE:**  
Undertake strategies to reduce light trespass from buildings, particularly during migration seasons.

REDUCING EXTERIOR BUILDING AND SITE LIGHTING has been proven effective at reducing nighttime migratory bird collisions and mortality. At the same time, such measures reduce building energy costs and decrease air and light pollution. These guidelines encourage efficient design of lighting systems as well as operational strategies to reduce light trespass from buildings, particularly during migration seasons.

## CONSIDER EXTERIOR LIGHT TRESPASS

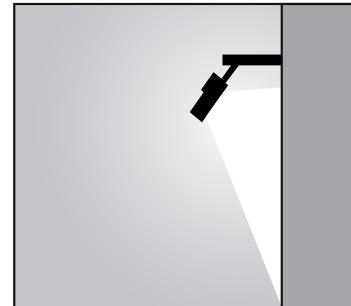


Lighting diagrams courtesy of the City of Toronto

Light pollution is largely a result of inefficient exterior lighting.

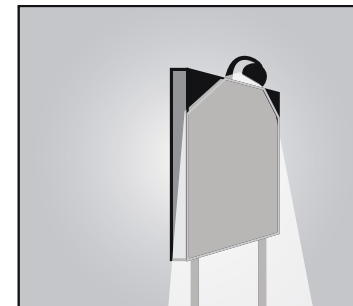
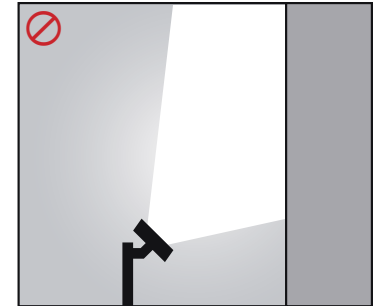
- Eliminate light directed upwards by attaching cutoff shields to streetlights and external lights.
- Highlight building features without up-lighting.
- Reduce the amount of light that spills outside areas where it is needed for safety and security.
- Maximize the useful light directed to targeted areas.
- Eliminate the use of spotlights and searchlights during bird migration.

## PREFERRED

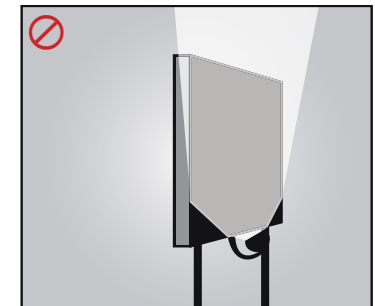


Direct exterior lighting downwards and adhere to Lights Out Guidelines

## DISCOURAGED



Light advertising from above to reduce the light projected skyward

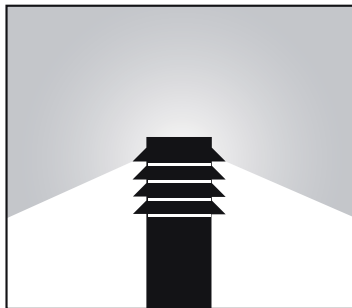
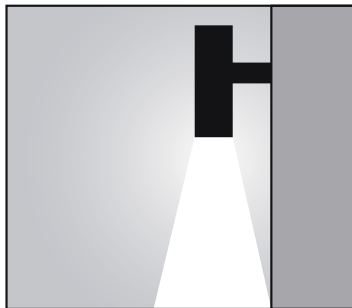
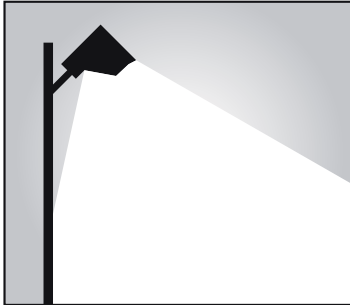


## DID YOU KNOW?

Red lights that don't flash are most attractive (and therefore deadly) to birds. Instead, use flashing white or non-flashing blue or green lights.<sup>24</sup>

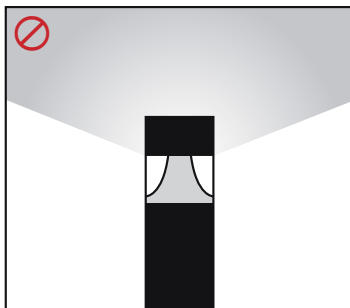
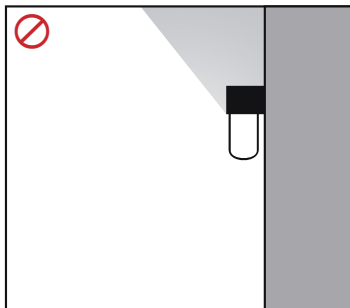
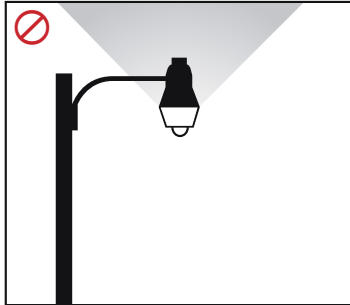


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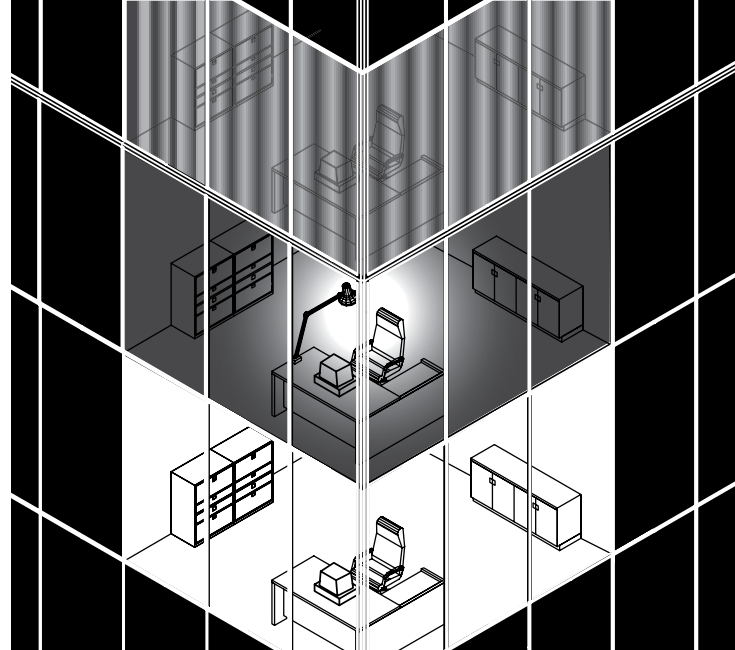
Preferred lighting designs project light downward, reducing waste and light pollution.

## DISCOURAGED



Discouraged lighting designs cause spill light to be directed into the sky where it is not needed.

## CONSIDER INTERIOR LIGHT TRESPASS



Light trespass from within buildings can be reduced through design and operational changes.

- Design lights to shut off using automatic controls, including photo-sensors, infrared and motion detectors. These devices generally pay for themselves in energy savings within one year.
- Reduce the need for extensive overhead lighting.
- Encourage the use of localized task lighting and shades.
- Reduce perimeter lighting and/or draw shades wherever possible.

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EQ 6.1 Controllability of Systems: Lighting  
EA 1 Optimize Energy Performance

## WASTED LIGHT

Light pollution is largely the result of bad lighting design, which allows artificial light to shine outward and upward into the sky, where it's not wanted, instead of focusing it downward, where it is.  
*National Geographic, November 2008*

# Building Operations

**OBJECTIVE:**

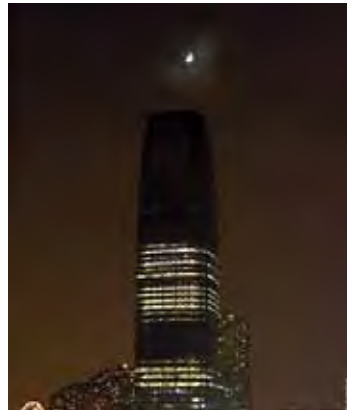
*Further reduce light trespass through operational procedures. Implement monitoring programs to determine bird-collision areas and success of light reduction.*

GREAT STRIDES CAN BE MADE to reduce light pollution from buildings during normal building operations. These strategies apply to new and existing buildings and often require the commitment and participation of both building owners and users. In addition, implementing bird-collision monitoring practices will help identify problem areas of a building or site.

**CONSIDER DAYTIME CLEANING**

Cleaning during normal work hours is becoming more common and can reduce bird mortality and light pollution. Such a schedule reduces energy consumption and enhances security. If cleaning during the day is not an option:

- Complete nightly maintenance activities before midnight or earlier.
- Instruct cleaning crews to work down from the upper stories, turning off lights as they go.

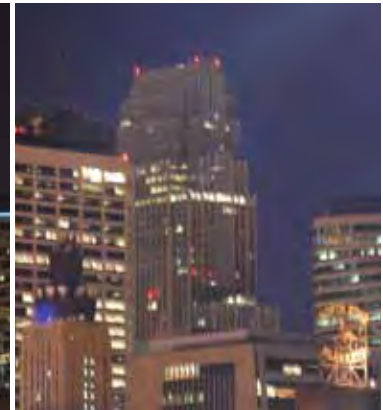


Clean buildings from the top down

**CONSIDER LIGHTS OUT**



The iconic Wells Fargo building was the first to sign on to Lights Out in Minnesota



**CONSIDER BIRD MONITORING**

Implementing daily bird-collision monitoring provides valuable information for science and for prioritizing building retrofits.

- Sweep the building perimeter, setbacks, and roof daily for injured or dead birds.
- Note specific times, dates and locations of birds that are found.
- Work with Project BirdSafe to document all bird deaths and assist injured birds. Most birds are protected by the Migratory Bird Treaty Act of 1918.



Bird monitoring pinpoints problem areas

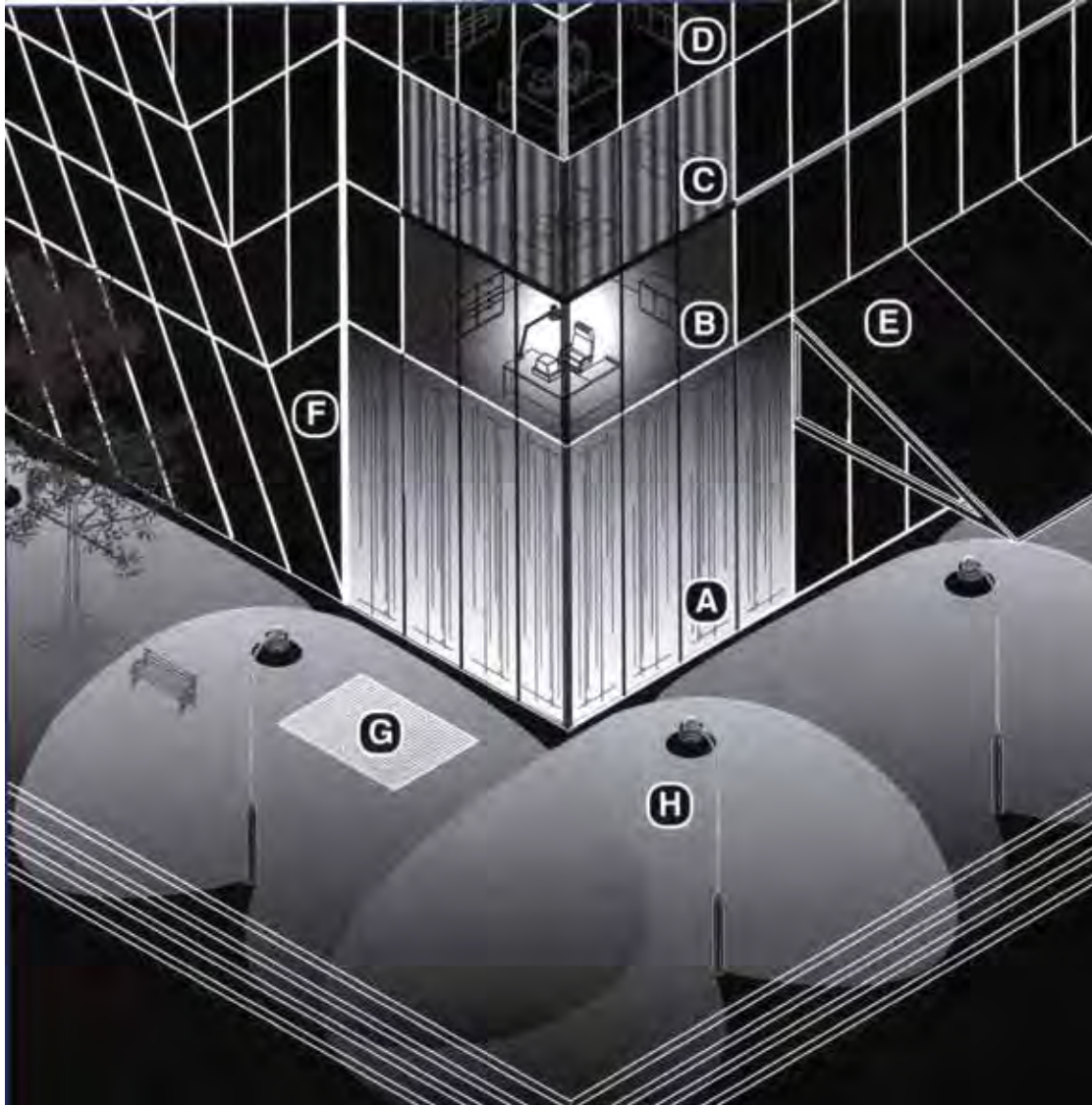
Lights Out programs are city or state-wide initiatives designed to reduce light pollution and bird mortality. In Minnesota, Lights Out is coordinated by Audubon Minnesota's Project BirdSafe using these parameters:

- Building owners and facility managers extinguish all unnecessary exterior and interior lights from at least midnight to dawn especially during bird migration periods:
  - (Spring) March 15 to May 31
  - (Fall) April 15 to August 31
- Priority lights include: exterior architectural lighting; interior lighting especially on upper floors; lobby and atrium lighting.

It is also recommended that building managers work with Project BirdSafe to monitor the effectiveness of Lights Out programs by tracking bird collisions and mortality rates. In addition, tracking light emission reductions and cost savings can provide valuable statistics.

**Sign on to Lights Out at [mn.audubon.org](http://mn.audubon.org)**

# Comprehensive Site Strategy



The overall rate of collisions at a given building is based on many variables. Solutions can be implemented at the initial design stage or with modifications or operational changes. The following examples represent a comprehensive bird-friendly site strategy.

- A. Treatment applied to glass projecting visual markers to make it visible to birds
- B. Task lighting in use after dark
- C. Blinds drawn after dark
- D. Lights off after work hours
- E. Awning blocks reflections on lobby windows from above
- F. Glass effectively angled to reduce strike angle and project reflections downward
- G. Bird-friendly site ventilation grates
- H. Use of lighting fixtures effectively projecting light downward



MIKE LEVITZ

Blue-winged Warbler

# Modifications to Existing Buildings

## OBJECTIVE:

*Undertake alterations or retrofits to buildings with high incidence of bird collisions.*

IMPLEMENTING BIRD-SAFE STRATEGIES for new buildings provides important opportunities to protect birds through design. However, new buildings represent only a small fraction of those responsible for bird fatalities. Retrofitting existing buildings is an important challenge and opportunity to help reduce bird-building collisions. Systematic site analysis and bird monitoring can dictate priorities for building modifications, programmatic enhancements and landscape adjustments to benefit birds.

## CONSIDER YOUR BUILDING AND SITE



Identify problem areas

Specific bird-collision problem areas can be identified and targeted for intervention during routine building maintenance activities.

- Analyze your building facility and site to determine the presence and extent of bird collision hazards. Use checklist at right.
- Integrate bird monitoring efforts with daily maintenance. See “Bird Monitoring” page 26.
- Undertake retrofits and other strategies to reduce bird collisions.
- Continue monitoring building(s) to determine the effectiveness of retrofits in reducing or eliminating bird mortality.

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EA 1 Optimize Energy Performance

## CHECKLIST OF BIRD COLLISION LIABILITIES

This checklist summarizes conditions that contribute to bird injury and mortality. It may be used towards an initial evaluation of new and existing buildings for potential problems.

### Region

- Within Migratory Route
- Proximate to Migratory Stopover Destination

### Locale

- Near Attractive Habitat Areas
- Dense Urban Context (Reduced Sky Visibility)
- Fog-Prone Area

### Site

- Nearby Trees and Shrubs
- Adjacent to Grassy Meadows
- Water Features/Wetlands

### Façade Glass Coverage (Overall Percentage)

- Less than 20%
- Between 20 and 35%
- Between 35 and 50%
- Over 50%

### Special Features

- Unbroken Glass Expanses at Lower Levels
- Courtyard(s)
- Transparent Corners
- Glazed Passageways
- Glazed Site Dividers/Bus Shelters

### Glazing Characteristics

- Tinted
- Reflective
- Mirrored

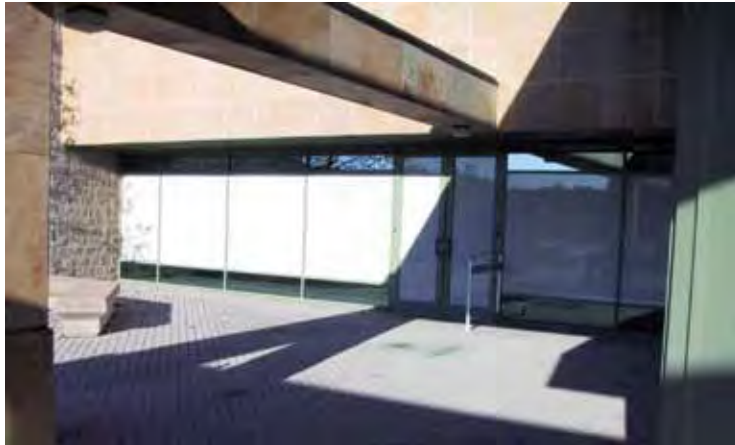
### Dusk and Night-Time Illumination

- External Façade Up-Lighting
- Non-Cut-Off Exterior Lighting
- Spill of Interior Lighting

### Other Building Elements

- Antennae
- Spires
- Guy-Wires

## CONSIDER MODIFICATIONS



NYC AUDUBON

Window film eliminated collisions in this courtyard at Patuxent Refuge in Maryland



LAURA ERICKSON

Window screening by Birdscreen installed at Rowe Audubon Sanctuary in Nebraska

If monitoring reveals bird collisions, building retrofits usually focus on eliminating reflections and fly-through effects or creating physical barriers. Many design strategies for new buildings and building operational changes (pages 16-26) can be used to improve existing buildings for birds.

**Retrofit problematic windows** and facades which cause birds to attempt to fly through glass or fly to reflections of habitat or sky. While creating visual barriers for birds, these strategies can simultaneously improve daylighting, save on energy costs, and enhance aesthetics.

- Install transparent or perforated patterned, non-reflective window films that make glass visible to birds.
- Consider painting, etching or temporarily coating collision prone windows to make them visible to birds.
- Add decorative exterior screening and/or solar shading devices, including louvers, awnings, sunshades, and light shelves.
- Consider re-glazing existing windows that experience high rates of bird collisions with translucent, etched, frosted, or fritted glass.
- Consider replacing large existing windows with multiple smaller units, divided lights, translucent, or opaque sections.

**Create a physical barrier** at notably hazardous windows to deter birds or reduce the momentum of their impact.

- Install netting over problem windows.
- Mount exterior coverings or insect screens.
- Incorporate latticework, artwork, shading or shielding devices outside glass.

**Make interior changes** to indicate glass barrier or remove attractants.

- Install and operate window blinds, shades, or curtains to hide interior views of plants and hiding places.
- Close curtains or blinds after dark if the interior is illuminated.
- Relocate or shield interior plantings, water sources, and other features that may be contributing to bird collisions.
- Install artwork or screening just inside glass to be clearly visible from outside at all angles.

**Dayshift cleaning cost savings** are estimated at 4-8% per year. That translates to \$145,790 – \$291,581 for a building like the IDS Center in Minneapolis or up to \$10 million a year if incorporated throughout the city.<sup>25</sup>

### CONSIDER OPERATIONAL CHANGES

In addition to incorporating bird monitoring with routine maintenance and security operations, an existing building that is experiencing bird collisions can consider other operational changes.

- Institute the practice of cleaning during the day to reduce light pollution and energy consumption, enhance security, and save money.
- Educate building users about the dangers of light trespass for birds.
- Incorporate lighting design changes to reduce spill light and automate lighting systems.
- Adopt a Lights Out policy for building and site.
- Utilize minimum wattage fixtures to achieve required lighting levels.

### CONSIDER LANDSCAPE ENHANCEMENTS

Generally the most effective way to solve bird-collision issues is by dealing with reflective or transparent glass issues as outlined on pages 20-21. Sometimes, it is possible to alter landscaping to improve bird safety at specific sites.

- Consider moving or shielding habitat that is being reflected in windows or is a lure from the other side of clear glass (fly-through effect).
- To address problematic glass windows, consider planting or re-locating trees and shrubs close to the building within a maximum of three feet. This planting strategy can block access to habitat reflections and birds alighting in these trees will not have the distance to build momentum on a flight path towards the glass. Such plantings can also provide beneficial summertime shading and reduce cooling loads.
- Create a green screen for foliage to grow adjacent to building exterior offering shading and visibility to birds.
- See “Site and Landscape Design” pages 16-17.

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 EQ 6.1 Controllability of Systems: Lighting  
 SS 5.1 Protect or Restore Habitat

### CONSIDER PROGRAMMATIC OPPORTUNITIES



Community art displays, like this one at St. Paul Travelers, can reduce bird collisions

Creative use of graphics can serve program needs and simultaneously create glazing opacity.

- Utilize decorative window films and banners to announce programs, enhance aesthetics, and display artwork.
- Consider rotating art displays in problematic windows during each migration season or on a more permanent basis. Such displays should create enough visual noise to be seen clearly from outside the glass at all angles.
- Research public art programs in your area as a way of encouraging window art displays.

# Hope for the Future



Architects, designers and biologists working together are our best hope for the future

BIRDS HAVE CAPTURED OUR HEARTS throughout history. We are captivated by their songs, their colors and their unlikely feats of endurance during migration. Birds have penetrated our arts, literature and even hijacked our leisure time. And birds are indicators of the state of our world. We all have a stake in their future.

While the challenges we all face in protecting biodiversity seem daunting, solutions abound. With commitment we can halt and reverse the decline of birds and their habitats. Reducing hazards to birds navigating our built environment is one way to make a positive difference. Armed with the knowledge and best practices included in these guidelines, we can incorporate bird-safe strategies in our approach to new construction. And, with examples of other's successes, we can modify existing structures to reduce their toll on birds. In either case we need to take action.

We have great potential in our urban centers to engage people – from residents to community leaders, from students to executives – in making changes that help us all co-exist with nature. Being “green” is now a pervasive desire expressed in our product choices in the store, our design choices in our buildings and in our guiding principles as a culture. Incorporating the needs of birds is a logical progression in our concept of sustainable design and development. Working across disciplines using intellect and creativity can yield untold benefits for people and for birds in the future. 🐦



A polycarbonate core makes this glass visible to birds (IIT Student Center, IL)



Warblers like this Chestnut-sided will benefit from our creativity and collaboration

# New Construction

**MINNEAPOLIS CENTRAL LIBRARY** - Minneapolis, MN

▪ Architects: Pelli Clarke Pelli Architects ▪ Landscape design: Coen + Partners ▪ Architectural Alliance



Problem: Reflection



Problem: Transparency



Solution: Visual Noise



Solution: Vegetation near building



The Minneapolis Central Library incorporates bird-safe design techniques in several ways. Its variegated and curtained facade presents an identifiable pattern to birds, while an indigenous shale and birch garden at the building's north perimeter filters views to and from the main level reading rooms. This technique of planting very close to a building facade, in addition to providing shade, prevents incidents of fatal bird strike. Birds cannot see reflections cast upon the glass and are less likely to develop fatally high speed collision rates due to the close proximity of planting to glass. The Library's central atrium features angled glass, a dramatic architectural feature that also greatly eliminates reflections of habitat and sky from most angles. The likelihood of fatal collisions at this angle is also greatly reduced.



## AQUA TOWER - Chicago, IL

Architects: Studio Gang Architects



STUDIO GANG ARCHITECTS

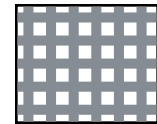
The Aqua Tower is a new Chicago landmark and the winner of the 2009 Emporis Skyscraper Award for high-rise architecture. This 82-story residential and commercial tower is a departure from the modern sheer glass skyscraper, incorporating an undulating pattern of exterior terraces which create an organic façade. Architect Jeanne Gang and her team not only aspired to create the natural look of eroded cliffs with the wavering terraces, they also convinced the developer to use fritted glass with a grey dot pattern and picketed railings on the balconies, all to enhance bird-safety. Gang has long been an advocate of bird-safe design and has incorporated bird-safe strategies in a number of her projects. [studiogang.net](http://studiogang.net)



Problem: Reflection



Problem: Transparency



Solution: Screen / scrim / fritting



Solution: Visual Noise

## SWARTHMORE COLLEGE UNIFIED SCIENCE CENTER - Swathmore, PA

Architects: Helfand Architecture and Einhorn Yaffee Prescott ■ Landscape design: Gladnick Wright Salameda; ML Baird & Co.



BIRDSANDBUILDINGS.ORG

This renovation and 75,000 square foot addition to an existing science facility was planned to create a series of outdoor courtyards that took advantage of the site's beneficial topography and mature trees. Sensitive to the liabilities of extensive glazing placed near attractive landscapes, the College and its architect consulted ornithologist Daniel Klem who proposed patterning portions of the glass at potential collision "hot spots." After testing several configurations, the designers decided to use a glass with a ceramic frit matrix at locations deemed susceptible to bird collision. Swarthmore engineering professor Carr Everbach designed a "thump sensor" webcam for installation next to windows to detect bird collisions. According to Klem, collisions have been reduced significantly to a mere one or two a year, giving Swarthmore confidence to extend the treatment to other campus buildings.

[archnewsnow.com/features/Feature171.htm](http://archnewsnow.com/features/Feature171.htm)

# Retrofitting Existing Buildings

**TOWN OF MARKHAM** – Markham, Ontario, Canada

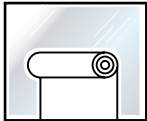
- The Convenience Group ▪ The Fatal Light Awareness Program (FLAP)



Problem: Reflection



Problem: Transparency



Solution: Use of plastic films, diachroic coatings and tints on facade



FLAP

This Town building with reflective glass and a solarium entrance has long been a site of bird strikes. The environment is one of six strategic goals for Markham Council. One of the town Councilors, Valerie Burke, championed bird-friendly buildings and design as an integral aspect of the environment. Town staff worked with FLAP and The Convenience Group to develop and apply a patterned window film to address the bird collision problem.

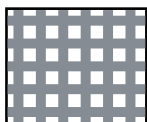
This is the first application of a bird-friendly window film on a municipal building in the Greater Toronto Area. Initial results indicate the film is very effective in eliminating collisions. This application could serve as a highly influential tool for convincing building managers and governments at all levels to make their structures bird-friendly.

[flap.org/markham.htm](http://flap.org/markham.htm)

**CUSANO ENVIRONMENTAL EDUCATION CENTER** – Philadelphia, PA - John Heinz National Wildlife Refuge



Problem: Reflection



Solution: Screen / scrim / fritting / net



BILL BUCHANAN

This green building demonstration project, completed in 2001, was built adjacent to a wetland. Its glazed elevations, while affording intimate views of the natural surrounding, caused bird fatalities. The problem was successfully remedied through a partial retrofit with fine netting.

## MORGAN MAIL – Manhattan, NY

▪ SurfaceCare ▪ New York City Audubon



NYC AUDUBON

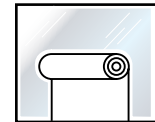
New York City Audubon's Project Safe Flight volunteers identified the six-story Morgan Mail Processing Facility as a high-collision site. The building had a full city block of black reflective spandrel panels facing a park. Birds in the park were hitting the building because of the habitat they saw reflected in Morgan Mail's façade. Alerted to NYC Audubon's mortality findings, postal officials worked with SurfaceCare to resolve this problem. They applied a vinyl black matte signage film to the exterior on all 440 (8' by 5') panels of glass (left, during installation). The solution was a success and the building went from being one of New York's deadliest buildings for birds to one of its safest.

[nycaudubon.org](http://nycaudubon.org)

[surfacecareusa.com](http://surfacecareusa.com)



Problem: Reflection



Solution: Use of plastic films, diachroic coatings and tints on facade

## ADLER PLANETARIUM – Chicago, IL

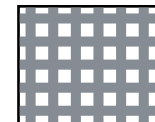


BIRDSANDBUILDINGS.ORG

This glass pavilion positioned directly adjacent to Lake Michigan encloses the Adler Planetarium's exit stair. Noting that it was causing bird death and injury, the Museum maintenance staff sought to address the problem first through the application of traditional bird decals. When that solution proved ineffective, they subsequently upgraded to this painted striping system for the glass fronting the lake, which has largely solved the problem.



Problem: Transparency



Solution: Screen / scrim / fritting

# Building Operations

**HEALTHPARTNERS** – Bloomington, MN



Problem: Beacon effect, illumination



Problem: Reflection



Solution: Lights out



HealthPartners signed on to participate in the Lights Out program in Minnesota as soon as they heard about it in the local media. They embraced Lights Out and incorporated it along with other facility-wide energy saving measures. Because they are a healthcare company and house a department of 24 hour on-call phone agents, HealthPartners did have certain interior lights in use all night long. In response, the company moved those employees to the lower level of the building and into the interior in order to allow the perimeter lights to be extinguished at night. HealthPartners has also hosted an informational session about birds for their employees and monitors the building for birds. In fact, they have made bird monitoring part of their landscaping contract and work with Project BirdSafe to document and take care of any birds they find.



Problem: Beacon effect, illumination



Solution: Lights out

**STATE OF MINNESOTA** – Lights Out Law

In May 2009 the State of Minnesota passed legislation requiring occupants of state-owned or state-leased buildings to attempt to reduce dangers posed to migrating birds by turning off unnecessary lights between March 15 to May 31 and August 15 to October 31 from midnight to dawn. The law allows the Commissioner of Administration to adopt policies for the practical implementation of this law for prisons and other facilities that depend upon night lighting. The Lights Out law was sponsored by State Representative Phyllis Kahn (DFL – Minneapolis) and inspired by Audubon Minnesota's Lights Out program.

Chapter 101, Article 2, Section 54 [16B.2421] BIRD-SAFE BUILDINGS

**HENNEPIN COUNTY** – Dayshift cleaning

Starting in March 2010 about half of Hennepin County Minnesota's 63 buildings transitioned to day shift cleaning to save on electricity, heating and cooling costs. Savings are expected to be at least \$100,000 annually. With this move, Hennepin County joined a trend that has been popular in the private sector for some time. While day-shift cleaning is generally initiated as a cost-savings measure, it has many other positive side-effects for workers and for the environment. The reduction in greenhouse gas emissions and decrease in light pollution from interior lights make daytime cleaning a very positive move for the birds.

[bluegreenalliance.org/press\\_room/press\\_releases?id=0064](http://bluegreenalliance.org/press_room/press_releases?id=0064)

# Products and Innovations

While product innovations continue to emerge, many currently available products have potential bird-safety features even if they were developed for other purposes such as balanced daylighting, innovative aesthetics, building safety and security, and energy efficiency.

The following material sources may contribute to bird safety for new or existing buildings. Products and manufacturers listed below are for information only, and are neither recommended nor endorsed by Audubon Minnesota and its Project BirdSafe partners.

## Translucent and Decorative Glazing:

3Form ([3-form.com](http://3-form.com))  
 Bendheim ([bendheim.com](http://bendheim.com))  
 Cabont Nanogel/Aerogel ([cabot-corp.com](http://cabot-corp.com))  
 Goldray Industries ([goldrayindustries.com](http://goldrayindustries.com))  
 Kalwall ([kalwall.com](http://kalwall.com))  
 Major Industries ([majorskylights.com](http://majorskylights.com))  
 Schott ([us.schott.com](http://us.schott.com))  
 TG P/Pilkington Profilit ([tgpamerica.com](http://tgpamerica.com))  
 Viracon ([viracon.com](http://viracon.com))

## Decorative Ceramic Fritting:

Goldray Industries ([goldrayindustries.com](http://goldrayindustries.com))  
 Oldcastle Glass ([oldcastleglass.com](http://oldcastleglass.com))  
 Viracon ([www.viracon.com](http://www.viracon.com))  
 PPG Industries ([ppg.com](http://ppg.com))

## Applied Window Films and Spectrally Selective Glass:

Arnold Glas, Ornilux ([glaswerke-arnold.de](http://glaswerke-arnold.de))  
 Collidescape ([fetchgraphics.com](http://fetchgraphics.com))  
 Solutia / CPFilms Inc. ([cpfilms.com](http://cpfilms.com))  
 SurfaceCare USA ([surfacecareusa.com](http://surfacecareusa.com))  
 The Convenience Group ([conveniencegroup.com](http://conveniencegroup.com))  
 U.S. Dept. of Energy ([eere.energy.gov](http://eere.energy.gov))

## Electrochromic Glass:

Sage Electrochromics Inc. ([sage-ec.com](http://sage-ec.com))  
 Smart Glass International ([smartglassinternational.com](http://smartglassinternational.com))

## Architectural Metal Mesh:

Cambridge Architectural ([cambridgearchitectural.com](http://cambridgearchitectural.com))  
 GKD Metal Fabrics ([gkdmetalfabrics.com](http://gkdmetalfabrics.com))  
 Johnson Screens ([johnsonscreens.com](http://johnsonscreens.com))

## Building-Integrated Photovoltaics:

PowerFilm ([powerfilmsolar.com](http://powerfilmsolar.com))  
 Uni-Solar ([www.uni-solar.com](http://www.uni-solar.com))  
 ARCH Aluminum and Glass ([archaluminum.net](http://archaluminum.net))

## Exterior Louvers and Sunscreens:

Hunter Douglas Contract ([hunterdouglascontract.com](http://hunterdouglascontract.com))  
 Industrial Louvers Inc. ([www.industriallouvers.com](http://www.industriallouvers.com))  
 Nysan Shading Systems ([nysan.com](http://nysan.com))  
 Savannah Trims ([suncontrolers.com](http://suncontrolers.com))

## Façade-Integrated LEDs:

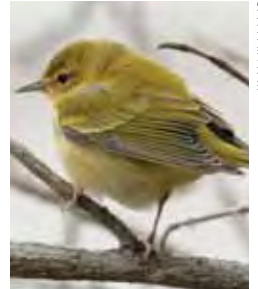
Cambridge Architectural ([cambridgearchitectural.com](http://cambridgearchitectural.com))  
 GKD Metal Fabrics ([gkdmetalfabrics.com](http://gkdmetalfabrics.com))  
 Schott ([us.schott.com](http://us.schott.com))

## Window Treatments and Banners:

Banner Creations ([bannercreations.com](http://bannercreations.com))  
 Biographix ([rainierdisplays.com/biographix.html](http://rainierdisplays.com/biographix.html))

## Exterior Coverings, Nettings, Screening:

Bird-B-Gone ([birdbgone.com](http://birdbgone.com))  
 Nixalite bird exclusion netting ([nixalite.com](http://nixalite.com))  
 StealthNet ([birdbarrier.com](http://birdbarrier.com))  
 TopRite Netting ([cutlersupply.com](http://cutlersupply.com))



Tennessee Warbler

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# Local Resources



REBECCA FIELD



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REBECCA FIELD



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Local organizations, programs and citizens track bird populations and protect bird species like the Ovenbird, Eastern Bluebird, Baltimore Oriole, Ruby-throated Hummingbird, and White-throated Sparrow

IN MINNESOTA a variety of organizations have established programs related to bird-collision monitoring, bird counting, population mapping and identification of key habitat including Important Bird Areas. Data from these programs can be used in developing natural resources inventories for development projects. Corporations can also get involved in these efforts as a contribution to their community and for the enrichment of their employees.

- **Bird Collision Monitoring:** Project BirdSafe volunteers conduct surveys daily during migration along established research routes. Surveys can also be started at any interested building in conjunction with the project. Surveys involve collection of injured and dead birds resulting from building collisions in accordance with established bird monitoring protocols. Visit [mn.audubon.org/birds-science-education/project-birdsafe](http://mn.audubon.org/birds-science-education/project-birdsafe)
- **Important Bird Areas (IBA):** This international conservation effort identifies, designates, monitors and conserves the most valuable habitats for birds. An Important Bird Area (IBA) is a site that provides essential habitat for breeding, wintering, and migrating bird species. In Minnesota the IBA program is a joint effort between Audubon Minnesota and the Minnesota DNR Non-game Wildlife program. Visit [mn.audubon.org/birds-science-education/important-bird-areas](http://mn.audubon.org/birds-science-education/important-bird-areas) or [www.dnr.state.mn.us/iba/](http://www.dnr.state.mn.us/iba/)
- **Christmas Bird Count (CBC):** This one-day annual event has been conducted for over a century. The CBC database contains more than 100 years of data on winter bird populations across the Americas. In Minnesota the Christmas Bird Count is done in partnership with the Minnesota Ornithologists' Union. Visit [moumn.org/CBC/](http://moumn.org/CBC/)
- **Minnesota Breeding Bird Atlas:** Starting in April 2009, volunteers began documenting evidence of breeding birds throughout the state. The project will continue through the summer of 2013 and will result in a detailed atlas of all breeding bird species in the state. The presence and abundance of birds provides valuable information about the health of our environment. This atlas will be an important baseline for future surveys. Visit [mnbbba.org](http://mnbbba.org).
- **The Wildlife Rehabilitation Center** ([wrcmn.org](http://wrcmn.org)) and **The Raptor Center at the University of Minnesota** ([raptor.cvm.umn.edu](http://raptor.cvm.umn.edu)) provide emergency medical care for injured birds and animals from all over Minnesota.
- **The Red-Headed Woodpecker Recovery Project** ([redheadrecovery.org](http://redheadrecovery.org)), **Minnesota Purple Martin Conservation Project** ([mnmartin.org](http://mnmartin.org)) and **Bluebird Recovery Program** ([bbrp.org](http://bbrp.org)) are species-specific conservation programs that may be applicable to corporate campuses in the appropriate habitats.
- **Great Backyard Bird Count:** This annual Presidents' Day Weekend event is an opportunity for volunteers to count the birds in their backyards and beyond. Visit [birdsource.org/gbbc](http://birdsource.org/gbbc).

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  11. The world's tallest structure is the 2,720 ft. tall Burj Khalifa in Dubai, United Arab Emirates which opened 4 January 2010. It is taller than any other man-made structure ever built. The two tallest buildings in the USA are the Willis Tower in Chicago (formerly Sears Tower) at 1450 ft and the Empire State Building in New York City at 1250 ft. The tallest Minnesota building is the IDS Tower at 792 ft. [en.wikipedia.org/](http://en.wikipedia.org/)
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## Online Resources

The American Bird Conservancy ([abcbirds.org](http://abcbirds.org))

Birds & Buildings Forum ([birdsandbuildings.org](http://birdsandbuildings.org))

Chicago Audubon ([lightsout.audubon.org](http://lightsout.audubon.org))

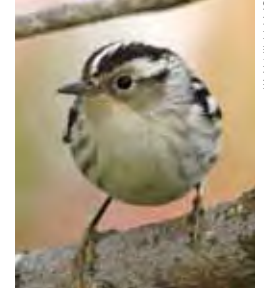
Chicago Bird Collision Monitors ([birdmonitors.net](http://birdmonitors.net))

The Fatal Light Awareness Program ([flap.org](http://flap.org))

Muhlenberg College – Acopian Center for Ornithology ([aco.muhlenberg.edu/aco.htm](http://aco.muhlenberg.edu/aco.htm))

New York City Audubon ([nycaudubon.org](http://nycaudubon.org))

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Black and White Warbler

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