Comments: Green Building Initiative Proposed American National Standard 01-2008P: Green Building Assessment Protocol for Commercial Buildings

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We appreciate the opportunity to comment on this Proposed National Standard which, as GBI states in its introduction, "provides a method of assessing commercial building projects in relation to commonly valued environmental and efficiency outcomes". The following comments are generated by our belief that wild bird populations are an integral part of the "commonly valued environment" and as such deserve to be included in measures of the environmental impact of buildings. Birds have not been given this consideration to date. We would like to provide you with the information necessary to justify their explicit inclusion in the ANSI standard.

Background: The bird conservation community has become increasingly aware and alarmed about the enormous number of migratory birds killed by collisions with buildings. In the 1970's Dr. Daniel Klem, Jr., a leading scientist in the field of avian collisions, estimated that between 97.5 and 975 million birds were killed by collisions with windows every year in the United States, based on an estimate of 1-10 birds killed per building. Recent studies indicate that even the upper range of this estimate may well be too conservative. Collisions with buildings are now considered to be secondary only to habitat loss and degradation as a major source of anthropogenic mortality for birds, amounting to approximately 5% of the fall bird population (Klem 1990). According to the US Fish and Wildlife Service, of the 836 species of migratory birds they manage and protect as trust resources for the American people, more than 25% of them (223) are birds of conservation concern. Many of the victims of building collisions are from species with populations in decline.

Collisions are both a daytime and a nighttime phenomenon. Many of the neotropical songbirds that are killed in collisions with buildings are nocturnal migrants. At night, the intrusion of light into the air degrades the quality of migratory corridors, and adds elements of danger to an already perilous journey, particularly, although not exclusively, during unfavorable weather conditions. At night, lights on tall buildings, or intense uplights on buildings of any height, emit light fields that entrap birds reluctant to fly from a lit area to a dark one. In these conditions of low cloud cover, birds fly at lower altitudes, and important navigational aids that include the stars and moon, are not visible. Birds accumulate as their forward flight is interrupted by light fields within which they circle, leading to collisions with each other and the structure . Many use up important energy stores and fall to the ground from exhaustion.

During the day, stopover migrants, and those that survive night strikes, are at risk for collisions with windows in surrounding buildings as they seek cover and food to build up their fat reserves and resume migration. Many migrants that winter in South and Central America and breed in northern areas of the United States and Canada, complete their journeys in a series of nocturnal flights interrupted by stopovers ranging from 1-5 days. Birds are not able to perceive clear or reflective glass as a barrier to be avoided and thus are at high risk for collisions with windows. Particularly dangerous configurations and conditions include windows that reflect habitat and sky; provide "sight corridors" to indoor plantings or through to habitat on the other side of the building; and have internal glass corners. Window collision

hazards have increased as more of our modern buildings have been wrapped in glass exteriors, and have incorporated larger panes of plate glass. Studies have found that between 50%-90% of birds involved in collisions die, usually from brain hemorrhaging.

Glass buildings have come to represent the epitome of modern architecture, made possible by relatively recent engineering advances that have allowed the construction of glass curtain walls and energy efficient glazing techniques. Ironically, some of the strategies that gain credits in green building certification paradigms have had the unintended consequence of increasing collision hazards to birds. Design elements that promote "daylighting and views" invariably result in a greater portion of the building envelope being composed of glass, one of the positive correlates with bird collisions. Similarly, points are awarded for promoting biodiversity, green roofs and native landscaping, all laudable and desirable outcomes. However, these strategies are often attractants for birds, and unwittingly expose them to increasing collision threats by bringing them closer to glass.

It may be difficult to absorb the scope of the mortality birds are experiencing. One to ten birds killed per building may not sound alarming, but multiplied by the millions of buildings in our landscape, the total number is staggering. Also, while it is likely that all buildings kill at least some birds, we know that a variety of rather common buildings are extremely lethal. An urban corporate plaza in Toronto, Consilium Place, killed more than 6,500 birds in 6 years (www.flap.org). The six story Morgan Mail Handling Facility on Manhattan's West Side, killed 338 birds in the fall of 2006 (Delacretaz and Gelb 2006); a five story suburban office building, located at 11 Great Neck Road in Long Island, NY killed 73 of the 80 birds that collided with it in the fall of 2007 (Delacretaz and Gelb 2007); office buildings in suburban Richmond, Virginia killed an average of 29 birds per building over the course of one year (O'Connell 2001); and the LEED certified Emory University Mathematics and Science Center caused 40 deaths over 19 days in September, 2002 (Davis 2002). Collisions are happening all around us, but unless someone is looking for them, the problem is largely invisible to the public.

At this point in time, we have enough knowledge from real-world experience and scientific studies to specify what can be done to make windows more visible to birds. Retrofits that include exterior window films and netting have eliminated collisions at many buildings but are often aesthetically unacceptable. Netting is installed every fall at Emory University's Mathematics and Science Building to protect migratory birds from collisions with this LEED certified building. In contrast, the LEED certified Swarthmore College Unified Science Center was specifically designed to deter collisions by using fritted glass meant to be visible to birds, and has been the site of almost no avian collisions as a result.

Relatively recent experiments have examined what patterns are most effective to deter collisions. Based on forced choice trials in flight cages and field experiments, Both Klem (1990) and Rossler (2007) have shown that a dense pattern is most effective. Rossler has stated, "Under most conditions, a 2/3 reduction in the number of bird casualties can be expected for marking of the 10 v type", which is 2 cm. wide vertical lines that are 10 cm. apart (Rossler 2007 p. 49). Klem has noted that, "Glass surfaces must be uniformly covered with objects or patterns, separated (vertically) by 5 to 10 cm, to effectively prevent bird strikes at windows (Klem 1990 p. 127). (Cloth strips 2.5 cm. wide were used in his experiments on residential windows.)

With the knowledge we have to date, the green building community can begin to specify how to mitigate avian window collision dangers, and propose performance standards that will protect birds. The fact that birds require these protections should no longer comprise the terms of the debate. The terms should shift to what are the most effective ways to design and operate buildings to prevent bird deaths. There are many compelling reasons for action, not least of which is that migratory birds have specific legal protections under the Migratory Bird Treaty Act (MBTA). The US Fish and Wildlife Service invoked its legal obligation under the MBTA as the basis for bringing suit against the Moon Lake Electric Association to reduce unintended avian mortality caused by collisions with power lines. We hope that the green building industry will be proactive, and promote collision deterrents on a voluntary basis.

The standards we urge you to adopt are not prescriptive. They would enable architects to develop any number of creative ways to make the glass in their buildings visible to birds, and to specify external and internal light controls to reduce light spill/trespass/and sky glow, to reduce the collision hazard of artificial night lighting on migratory birds.

(It should be noted that the City of Toronto has adopted a voluntary rating system to guide developers in the creation of "bird-friendly" buildings. It was developed in consultation with the Fatal Light Awareness Program (FLAP), the City of Toronto and many other stakeholders, and has been well received by the development community. The following recommendations use the City of Toronto's *Bird-Friendly Development Guidelines* and *Bird-Friendly Development Rating System and Acknowledgement Program*, the *Bird-Safe Building Guidelines* published by NYC Audubon, and the sources cited throughout these comments (See Referenced), as the basis for the following recommendations.)

Recommendations:

1. **Include bird safety in the definition of a "green" building**. Because migratory birds have been and continue to be specifically harmed by collisions with windows and buildings at an alarming rate, it is incumbent on the industry to recognize and redress this harm now, and continue to refine requirements over time as new scientific research on collision deterrence becomes available.
2. **Measures to reduce bird collisions should be mandatory.**
3. **Specific Standards:**
    - **Bird Collisions and Roostings Standard 12.3** Bird Collisions and Roostings should not be grouped together. Bird Collisions are a documented and mortal threat to birds. Roostings are considered a nuisance to people. They do not belong together. We suggest replacing it with:

      12.3.2 Deter Bird Collisions

      12.3.2.1 Treat glass to deter collisions.

        - **Extent of treatment**: (First level of treatment should be mandatory)

- To the height of the atriums and lobbies/areas with sight lines through atriums and lobbies/alcoves/internal corners/where internal greenery is visible from the exterior of the building/ adjacent to green roofs
- To the height of the mature tree line
- To the height of the building

❖ **Type of Treatment to create visual markers and mute reflections**. (Some strategies to create visual markers include patterned/fritted glass, fenestration, film, grilles and/or louvers, decals, artwork. Some strategies to mute reflections include angled glass, screens, awnings and overhangs, sunshades.)

- A density pattern with not less than 10 cm. vertical separation
- Strategies to mute reflections

Informational References should add: City of Toronto Bird-Friendly Development Guidelines.

- **Exterior Building and Site Lighting and Controls**
  - ❖ **Exterior Light Pollution Standard 7.5.1** appears to address our concern that all exterior lighting fixtures be shielded. The highest standard would include all spotlighting on the building and rooftop be eliminated.
  - ❖ **Exterior Lighting Controls Standard 8.7.5** appears to enable exterior lighting to be controlled by a time switch or photo sensor which would enable building management to participate in a city-wide Lights Out program.

- **Interior Light Controls and Light Reduction Controls**
  - ❖ **Interior Automatic Light Shutoff Controls Standard 8.7.2** appears to address our concern that unnecessary interior lighting will contribute to the "beacon effect" of buildings on birds at night. Time-Scheduling and occupant sensing devices enable effective participation in a Lights-Out program or regimen.
  - ❖ **Light Reduction Controls Standard 8.7.3** appears to address our concern that unnecessary lighting of interior spaces will interfere with bird migration.
  - ❖ **We recommend** including points for daylight cleaning operations and interior window treatments that are operable to control nocturnal light escape.
- **Special Water Features**
  - ❖ **Special Water Features Standard 9.8** It is our concern that ornamental fountains that are located within 5 feet of a building with windows have become a source of drowning for collision victims. We would therefore recommend that water features be located farther than 5 feet from the base of the building.
- **Additional Site Concerns**

- **Ventilation Grates** Ground level ventilation grates with a porosity of more than 2 cm. X 2 cm. can be a cumulative source of mortality for birds that fall into them after striking a window. Points should be given for meeting this standard or capping grates with greater porosity.
- **We recommend** planting landscape attractants such as trees and bushes within 3 feet of windows if the windows are not treated. This reduces mortality by reducing the velocity at which birds perched on landscaping fly towards habitat reflected in adjacent windows.

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