

LEDucation 2025

BIRD UTOPIA

By the Lighting Recommendation. Based on the study of the impact of Daytime and Nighttime in High-rise Building Areas on Birds in New York City

> BY AURA - NAT SIRIKANOKVILAI MARCH 18 2025





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Learning Objectives

At the end of this course, participants will be able to:

- 1. Recognize the negative impacts that affect the birds, including bird collisions and the disruption of bird migration.
- 2. Understand the nature of the birds and the relationship of birds and lighting during the daytime and nighttime.
- 3. Revisit the lighting recommendations based on research into the effects of daytime and nighttime lighting on birds in high-rise areas of New York City.
- 4. Explore the concept of Bird Utopia and how it can be integrated or applied in architectural design.





The RESEARCH delves into establishing **bird-friendly lighting design standards** to **reduce harm** and **improve the well-being of avian populations** in a chosen urban environment, particularly high-rise building areas. It also addresses the practical obstacles and considerations associated with implementing **"THE BIRD UTOPIA"** concept, intending to **develop habitats** suitable for the diverse needs of both **local** and **migratory bird** species within urban settings.







Why the Birds?















What has been compromising the bird's life quality?





DEAD

DISORIENTED

BIRD COLLISION

LIFE CYCLE DISRUPTION

EXHAUSTED

INJURED

BIRD MIGRATION



Billions of bird collisions occur annually in North America

OR

31 Bird collisions in **every seconds**

















Birds fly directly and crash into the glass window. In results, injured and dead.





LOWER

MIDDLE

UPPER

A comparison each area in NYC, in different years to see the area most densely collided.





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BIRD MIGRATION

- Birds migrate to search for locations they can foraging And escape the coldness during the winter season
- During Spring(March-June) & Fall(August-November)
- Birds using **3 methods** for navigating the migration
 - Topographical
 - Astronomical and physical signposts
 - Night time
- Not every birds using the Night time method, But birds migrate at night, up to **912,500** birds in **NYC**.





LIGHT POLLUTION: *The glowing sky* at night due to high numbers of electric light at night, light spills into the sky. Causing multiple affects like excessive in energy used, disrupt of Circadian System, disturbing and compromise quality of life, including **bird that migrates at night**.



Tribute in Light



Light Pollution Map









DAYTIME - Most collided Bird Species(NYC)





NIGHTTIME - Most migrating Bird Species





DAYTIME - Most collided Bird Species(NYC)

Warblers





Sparrow



Thrushes





Spring Season







Tanager

Fall Season







Dark Eyed Junco



Гanager





Existing Case Study, Research and Solutions





How to reduce Bird Collision

Add an element on to the glasses to help the birds see the glass surface

- Film sticker on Glass
- Frit Pattern Glass
- UV Glass



UV Glass

Frit Pattern Glass

Dimension of pattern should be smaller than 2" x 4" or the fly through spacing of bird





How to reduce Bird Collision

Birds ' contrast perception aren't good, reduce flat surface, add depth element will help the vision

- Screen / Double Skin

New York Times

- Façade Elements: Vertical / Horizontal Shading



Layers of facade

Merril's Cathedral of Christ the Light



Glasses structure pattern



How to reduce Bird Collision

Due to bad contrast perception, birds are likely to fly toward bright surface,

starting from early morning when the sun rise touches the glass window or any high reflective surface, It will emit high luminance and draw birds to fly toward it.

- Reduce bright surface material

Material	% Reflectance	Characteristics		
Reflecting				
Specular				
Mirrored and optical coated glass	80-99	1		
Metallized and optical coated plastic	75-97	Provide directional control of light and		
Processed anodized and optical coated aluminum	75-95	brightness at specific viewing angles.		
Polished aluminum	60-70	Effective as efficient reflectors and for special decorative lighting effects.		
Chromium	60-65			
Stainless steel	55-65	-		
Black structural glass	5			
Spread				
Processed aluminum (diffuse)	70-80	n		
Etched aluminum	70-85	General diffuse reflection with a high specular surface reflection of from 5 to 10 per cent of the light.		
Satin chromium	50-55			
Brushed aluminum	55-58			
Aluminum paint	60-70	1		
Diffuse				
White plaster	90-92	Diffuse reflection results in uniform surface		
White paint*	75-90	brightness at all viewing angles. Materials of this type are good reflectingbackgrounds for coves and luminous forms.		
Porcelain enamel*	65-90			
White terra-cotta*	65-80			
White structural glass	75-80			
Limestone	35-65			





How to reduce Bird Migration Disruption

- Tribute In Light examination



- September 11, 2015 10:12 PM 10:32 PM New York New York off on Tribute Tribute in Light in Light 15,700 birds 500 birds within 0.5 km within 0.5 km 0km 1km 2km 0km 1km 2km Number of birds Low High
- Strong Beam of lightAttract birds during their migration
- A significant difference quantity of birds being drawn by the beam of lights
- Reduce bright surface material
- Reduce quantity of Light Pollution (Fixture installation, Fixture Direction, Additional Accessories, Reduce time of light turns on)
- Minimize the use of lethal light spectrum





How to reduce Bird Migration Disruption



Based on artwork by Sheri Williamson

- Birds can see wider light spectrum than humans
- Each species have its own spectrum ranges, and Oil droplets sensitive with different wavelengths











Feedback from the interview

Architect (FxCollaborative, Circa Central Park's architect)

- For existing building, the most effective solution with the least budget spent is **apply film/sticker** onto the glass window. This way, it can maintain the visual connection between interior and exterior.

COMPARISON OF RETROFIT OPTIONS

Material	Effectiveness	Cost	Application	Appearance	Longevity	Upkeep
Seasonal, temporary solution	***** S	\$	•	•	na	na
Netting	•••••	\$\$	••	•••		•••
Window film	*****	\$\$\$	••••	*****		••••
Screens	*****	\$\$	***	****	•••••	••••
Shutters	•••••	\$\$\$	•••	••••	•••••	••••
Grilles	*****	\$\$\$	****	*****		****
Replace glass	*****	\$\$\$\$\$	•••••	•••••	•••••	••••
5 stars/dollars =	highly effective	expensive	easy	attractive	long-lasting	minimal

Zoo Horticulture Consultant and Design

- Creating more green/ nature spaces to the existing building (with glass window/ facade)

can reduce chances of bird collision, also expand more areas for foraging and vegetation.

Architect and Bird Consultant

- The least electric lights, the better for nature and all living species.
- Reducing the brightness of the flat surface will reduce the chance of bird collision (birds have poor contrast vision).
- The most effective and cheapest intervention to prevent bird from crashing into the surface is using Screen.
- Screen is also a positive solution for **blocking the light leak** from interior during nighttime.











The Study of Existing Intervention During Daytime and Nighttime





Material reflection and Daylight studies





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Material Transmittance and Light Pollution studies













Bird-Friendly Lighting Design Criteria

- Less electric lighting, the better
- Reduce using glass, if it cannot be avoided:
 - use intervention that help improve the glasses vision to the birds (Film/UV/ Frit Glass)
- Reduce the contrast or bright/ high reflective surface /material
- Eliminate Light Pollution/ Skyglow by:
 - reduce light leaks from interior (Screen)
 - reduce the uplighting/ material that reflects light into the sky
- Avoid dangerous Lighting Spectrum:
 - Red (633 650 nm): causing a disorienation and disturb the magnetic field for navigation
 - High intensity of Full White Spectrum/ UV can cause flicker effect
- Use Friendly Lighting Spectrum:
 - Green (571 nm) & Full White Spectrum: effect the least for migration
 - Lighting Spectrum with <530 nm. Attracts some insects >> good for foraging
 - White Spectrum create the least flicker effect
- Vertical & Horizontal shading is effective for reduce luminance during daytime
- Screen reduce the light leaks from interior the most





Lighting Design for **Bird Utopia**







Light Pollution Map

Bird Collision

Bird Habitat





BIRD UTOPIA

a combination approach called Bird Utopia that consists of 3 main elements, each of which is applied with bird-friendly lighting design criteria.

Bird-Friendly Tower

Integrated with human activities, offer bird-safe spaces and coexist with bird habitats in locations like Central Park.

UV Module

create intangible boundaries to deter birds from hazardous areas

Bird-Friendly Module

Locate on existing building rooftops provide temporary safe spots with bird-friendly lighting, nesting, and vegetation areas











BIRD-FRIENDLY MODULE









- Green wall for nesting and vegetation

- Screen Layer, provide protection & Reduce collision without blocking view

Insect module, providing food for birds



PN 7021.65 (365 nm) PN 7021.95 (395 nm)



Lighting Spectrum with <530 nm. Attracts some insects













BIRD-FRIENDLY TOWER









































CONCLUSION

The less lighting, the better

Future research endeavors should focus on **avian vision** and the impact of **lighting spectra on different bird** species' natural cycles

Identify a specific migration path of each bird species, in order to narrow down the area that most affect the bird migration and have more concentrate solution to the specific areas and species.

Some approach and suggestion might not be accurate and require more comprehensive research, experiment and data collection, the aim of this thesis is to raise the awareness of this tragic incident, encourage all designers and humans to be mindful of other life being, to keep in mind that even just a small action or acknowledge can always create the impact and improve a better life for other voiceless species



THANK YOU



Thank you for attending!

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Sutton South

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