BIRD FRIENDLY DESIGN
Architectural Design that Saves Birds' Lives

MARCH 13 • 6 PM
District Architecture Center
AGENDA

6:00 pm
Mary Lynn Wilhere, Urban Sustainability Administration, Department of Energy and Environment (DOEE)

6:05 pm
Tommy Wells, Director, Department of Energy and Environment (DOEE)

6:15 pm
Claire Cahan, Studio Design Director, Studio Gang, Chicago, IL -- "Building Habitat"

6:45 pm
Dan Piselli, Senior Associate, FxCollaborative Architects, LLP, New York, NY -- "Examples from NYC"

7:15 pm
Christine Sheppard, Ph.D., Director, Glass Collisions Program, American Bird Conservancy -- "The Nuts and Bolts of Bird Collisions"

7:35 pm
Anne Lewis, President, City Wildlife
Bird-Friendly Design in DC: Architectural Design that Saves Birds’ Lives

Examples from NYC

Daniel Piselli  AIA, LEED, CPHD
FXCollaborative
March 13, 2018
CASE STUDIES

The Javits Center Renovation

Statue of Liberty Museum

Columbia University School of Nursing

Center for Global Conservation

Columbia University Business School

New York Times Building
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INSULATING GLASS

# . SURFACE

# αSURFACE

LOW-E COATING

# ™SURFACE

# 0 SURFACE

AIR SPACE

BUILDING EXTERIOR

BUILDING INTERIOR
INSULATING GLASS: Frit on #1 Surface

- #. SURFACE
- #∞SURFACE
- LOW-\varepsilon\text{ COATING}
- #^\text{TM} SURFACE
- #0 SURFACE
- AIR SPACE

BUILDING EXTERIOR

BUILDING INTERIOR
INSULATING GLASS: Frit on #2 Surface External to Coating
INSULATING GLASS: Frit on #2 Surface Internal to Coating
INSULATING GLASS: Frit on #3 Surface

- #. SURFACE
- #∞SURFACE
- LOW-E COATING
- AIR SPACE
- #™SURFACE
- #0 SURFACE

BUILDING EXTERIOR   BUILDING INTERIOR
CENTER FOR GLOBAL CONSERVATION: UV Reflective Pattern
SYMBOLES:
• Hit prior to 5/29/09, killed
Ø Hit prior to 5/29/09, flew away
● Hit after 5/29/09, killed
○ Hit after 5/29/09, flew away
SYMBOLS:
- Hit prior to 5/29/09, killed
- Ø Hit prior to 5/29/09, flew away
- ● Hit after 5/29/09, killed
- ○ Hit after 5/29/09, flew away
CENTER FOR GLOBAL CONSERVATION: Strategies & Monitoring - East Facade

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JAVITS CENTER RENOVATION

Pre-Existing Aerial View
JAVITS CENTER RENOVATION: Pre-Existing Façade Condition
JAVITS CENTER RENOVATION: Bird Collision Location and Frequency - Fall 2007

Source: Project Safe Flight - New York City Audubon
JAVITS CENTER RENOVATION: Overview

- Green Roof
- Opaque Glass Replaced with Stainless Steel Panels
- New Low-Reflectance Fritted Glass
JAVITS CENTER RENOVATION: Green Roof, Urban Habitat
JAVITS CENTER RENOVATION: Green Roof, Urban Habitat
JAVITS CENTER RENOVATION: Replacement of Spandrel Glass with Metal Panel
JAVITS CENTER RENOVATION: Interior View
JAVITS CENTER RENOVATION: Frit Pattern Studies

15% Opacity 3/8" Round Dot

30% Opacity 1/8" Round Dot
JAVITS CENTER RENOVATION: Proposed Pattern for Bird Collision Reduction
JAVITS CENTER RENOVATION: Selected Frit Pattern for Reduction of Solar Heat Gain
JAVITS CENTER RENOVATION: Glass Coating & Frit Color Selection Process
JAVITS CENTER RENOVATION: Glass Before & After
JAVITS CENTER RENOVATION: Frit From Exterior
JAVITS CENTER RENOVATION: Frit from Interior
Results:
• Increased Performance
• Increased Daylight
• Increased Transparency

Spring Migration 2013:
Total of 4 Birds Found >90% Reduction!
THE NEW YORK TIMES BUILDING

Design Architect: Renzo Piano Building Workshop
Executive Architect: FXCollaborative
THE NEW YORK TIMES BUILDING: Terra Cotta Screen

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COLUMBIA BUSINESS SCHOOL: Frit to Emphasize Shapes
COLUMBIA BUSINESS SCHOOL: Frit to Emphasize Shapes
THE STATUE OF LIBERTY MUSEUM: Construction
THE STATUE OF LIBERTY MUSEUM: Architecture Integrated with Landscape
THE STATUE OF LIBERTY MUSEUM: Frit Design
# THE STATUE OF LIBERTY MUSEUM: LEED Pilot Credit 5.5

## BUILDING DATA

<table>
<thead>
<tr>
<th>Description</th>
<th>Value</th>
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<tbody>
<tr>
<td>Number of Stories</td>
<td>1</td>
</tr>
<tr>
<td>Building Height</td>
<td>36'</td>
</tr>
<tr>
<td>Total Façade Area</td>
<td>20890</td>
</tr>
<tr>
<td>Façade Zone 1 Area</td>
<td>20890</td>
</tr>
<tr>
<td>Façade Zone 2 Area</td>
<td>NA</td>
</tr>
<tr>
<td>Adjusted Building Façade Area</td>
<td>NA</td>
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</tbody>
</table>

## ZONE 1 HIGH RISK FACTOR CALCULATION (HRF)

<table>
<thead>
<tr>
<th>Material Type with Threat Factor &gt;75</th>
<th>HR Material Area (HRA)</th>
</tr>
</thead>
<tbody>
<tr>
<td>material 1</td>
<td>0</td>
</tr>
<tr>
<td>material 2</td>
<td>0</td>
</tr>
<tr>
<td>Windows &amp; Revolvers with Clear Glass</td>
<td>480</td>
</tr>
<tr>
<td><strong>High Risk Area (HRA) Totals =</strong></td>
<td><strong>480</strong></td>
</tr>
<tr>
<td>HRF = (HRA/Z1 Area) &lt;15%</td>
<td>2.3%</td>
</tr>
<tr>
<td>Zone 1 Material Type</td>
<td>Threat Factor</td>
</tr>
<tr>
<td>------------------------------------------</td>
<td>---------------</td>
</tr>
<tr>
<td>Precast Concrete &amp; Opaque Materials</td>
<td>0</td>
</tr>
<tr>
<td>Curtain Wall with Fritted Glass</td>
<td>20</td>
</tr>
<tr>
<td>Windows &amp; Revolvers with Clear Glass</td>
<td>100</td>
</tr>
<tr>
<td>Elevator Fritted Glass at Roof</td>
<td>20</td>
</tr>
<tr>
<td><strong>Z1 Area Totals</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Total Zone 1 ONLY Building BCTR</strong></td>
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</tr>
</tbody>
</table>
DESIGN OPTIONS

Medium Frit  Light Frit  Linear Frit  Side 1 Frit

UV Patterning  Thin Screening  Solar Screening  Solar Shading
Daniel Piselli  AIA, LEED, CPHD
Senior Associate
FXCollaborative
dpiselli@fxcollaborative.com
## Comparative Mortality

<table>
<thead>
<tr>
<th>Collisions with:</th>
<th>Date of reference</th>
<th>Mortality estimate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wind turbines</td>
<td>2012</td>
<td>573,000</td>
</tr>
<tr>
<td>Cell towers</td>
<td>2012</td>
<td>6,800,000</td>
</tr>
<tr>
<td>Power lines</td>
<td>2005</td>
<td>175,000,000</td>
</tr>
<tr>
<td>Buildings/glass</td>
<td>2013</td>
<td>1 billion</td>
</tr>
<tr>
<td>Cats</td>
<td>2013</td>
<td>1.5–3 billion</td>
</tr>
</tbody>
</table>

Most, but not all, victims are songbirds, ...especially warblers

Migrating at night,
Colliding by day,
Why don’t we see more of them?

Photo: Lynne Parks
Radar can be used to follow birds migrating at night.
Bright Light, Dark Background = Circling
Urban lighting increase: birds attracted everywhere into built environment

Houston 1873: twenty streets

Houston Metropolitan Area: 10,000 Square Miles Larger than State of New Jersey
People think they can see glass...
Birds don’t speak architecture
Bird’s Eye viewing

Birds have little depth perception, extensive peripheral vision, other senses to determine speed

Birds see more colors, magnetic field, many don’t see UV

Birds’ resolution < human
Birds often don’t expect a barrier ahead...
not looking where you’re going .....
What stops collisions?

Patterns that act as visual barriers

Birds have a very accurate sense of body shape and size

SOLUTIONS - 2” / 4” RULE

Dots: at least 3/8” diameter

Lines: at least 1/8” wide

Irregular shapes and spacing fine!

Horizontal lines with a maximum spacing of 2”

Vertical lines with a maximum spacing of 4”
MANDATORY
- Minnesota: Buildings, Benchmarks and Beyond
- San Francisco, CA: Standards for Bird-safe Buildings
- Oakland, CA: Bird Safety Measures
- Highland Park, IL new public buildings
- Cook County, IL (unincorporated)
- Toronto, Canada: Bird-friendly Development Standards
- Ontario, Canada: Environmental Protection Act, Species at Risk Act

VOLUNTARY
- Sunnyvale, CA: Standards for Bird-safe Buildings
- Palo Alto, CA
- California: CALGreen
- Calgary, Canada
- Barrington

IN PROGRESS
- Federal Bird-safe Buildings Act
- Portland, OR
- San Jose, CA
- Washington, DC
- Maryland
LEED Pilot Credit #55

LEED PILOT CREDIT # 55

SAN FRANCISCO BIRD-SAFE BUILDING STANDARD
What is a bird-friendly building?
More glass = more collisions

Low rise buildings kill more birds than high rise – more of them, often in suburban habitat
Cardinal directions vs reflected vegetation

Prioritize lower floors!
How to design a bird-friendly building:

Incorporate solutions from the beginning to eliminate added extra costs.

Strategies:

- **Reduce exposure** of glass
- **Incorporate signals** in/on glass
- **Minimize use** of glass

Bird friendly design overlaps with solar shading, glare control, security, thermal control, energy efficiency, and can be part of a distinctive design aesthetic.
Fritted glass

Intuit HQ, WRNS Studio
Fritted glass

Anchorage Museum,
David Chipperfield
Reduced exposure of glass
Bird-friendly glass

Brooklyn Botanical Garden, Weiss Manfredi
Reduced glass

Bronx Emergency Call Center, SOM
What About UV Patterns?

Arnold Glas
Ornilux Mikado

Glas-pro
Bird Safe Glass

Glastroesch
Silverstar Birdprotect Glass
Retrofit: film

Northwestern University
Solyx Bird Safety Film
Retrofit: Solyx Bird-safety Film

Left: Key West Airport
Above: Bronx Zoo
Retrofit: Feather Friendly

U of Pennsylvania Vet School

U of Guelph Arboretum

Pan American Sports Centre
Retrofit: Collldescape

National Renewable Energy Lab

Cape May Community College
Retrofit: Acopian BirdSavers

University of Florida

Private Home, Michigan

[Images of retrofit windows]
Retrofit: Home solutions
**Resources**

**YOU CAN SAVE BIRDS**
from flying into windows!

Millions of birds die every year, because they can’t tell reflections from reality. *Almost half hit home windows.*

Never had a bird hit your window? More likely, you haven’t been there when it happened. But the odds are that sooner or later, your windows will kill a bird.

Even small windows can be dangerous, as many birds fly into small spaces.

CSheppard@abcbirds.org

**Bird-Friendly Building Design**

Download at ABCBirds.org
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Learning Objectives

1. Identify factors leading to bird-glass collisions

2. Specify building design and lighting techniques to reduce these collisions

3. Assess success of current case studies relating to bird/glass safety

4. Follow up on recent code and advocacy developments relating to bird-friendly design
Bird-friendly Buildings in an Urban Setting

Anne Lewis, FAIA, President
City Wildlife, Inc.
“You run into a window, too?”
Yellowthroats – a mated pair
Walking the Routes
Sorting the birds
Some *Lights Out DC* birds
More every year…

2016 Lights Out DC birds
1 billion birds a year
A dangerous situation...
Reflections in the morning

Transparency at night

250 birds
Transparent overpass

Imprint of a collision

134 birds
Bird-safe film, exterior application
What we see.

What they see.

150 birds
A fly-through situation

188 birds
Nice on the inside…

a hazard outside
Bird Friendly Design

Anacostia Library
Architects: The Freelon Group
Shaw Library
Architect: Davis Brody Bond Aedas

Bird Friendly Design
Bird Friendly Design
What Can Architects Do to Help?

• Reduce Lighting
• Follow Bird-Safe Design Guidelines
• Use and Test Bird Safe Products
• Document and Report
• Spread the word

Lack of public awareness is the greatest threat.
Reduced Lighting Saves Energy:

**Thurgood Marshall Building Atrium**

- Atrium lighting reduced from 11pm-6am year-round
- Savings: 28%

**DC Court of Appeals Pavilion**

- Pavilion lighting reduced from 11pm-6am during migration
- Savings: 15%
LEED Pilot Credit 55: 
Bird Collision Deterrence

- Bird Collision Threat Rating: less than 15
- Building separated into Zones 1 and 2
- All materials assigned a Threat Factor
- Interior and Exterior Lighting Requirements
- Post construction monitoring and plan for corrective action
A proposal for DC’s Green Construction Code

• An elective under Appendix A
• Incorporates LEED Pilot Credit 55
• Provides one extra credit for buildings that remediate more glass (> 40% glass overall, or > 75% glass on any two facades)
• Lighting reduced until 7 am

Green Buildings Shouldn’t Kill Birds

Photo: Matt Reinbold
Contact us for help.

info@citywildlife.org
anne.lewis@citywildlife.org