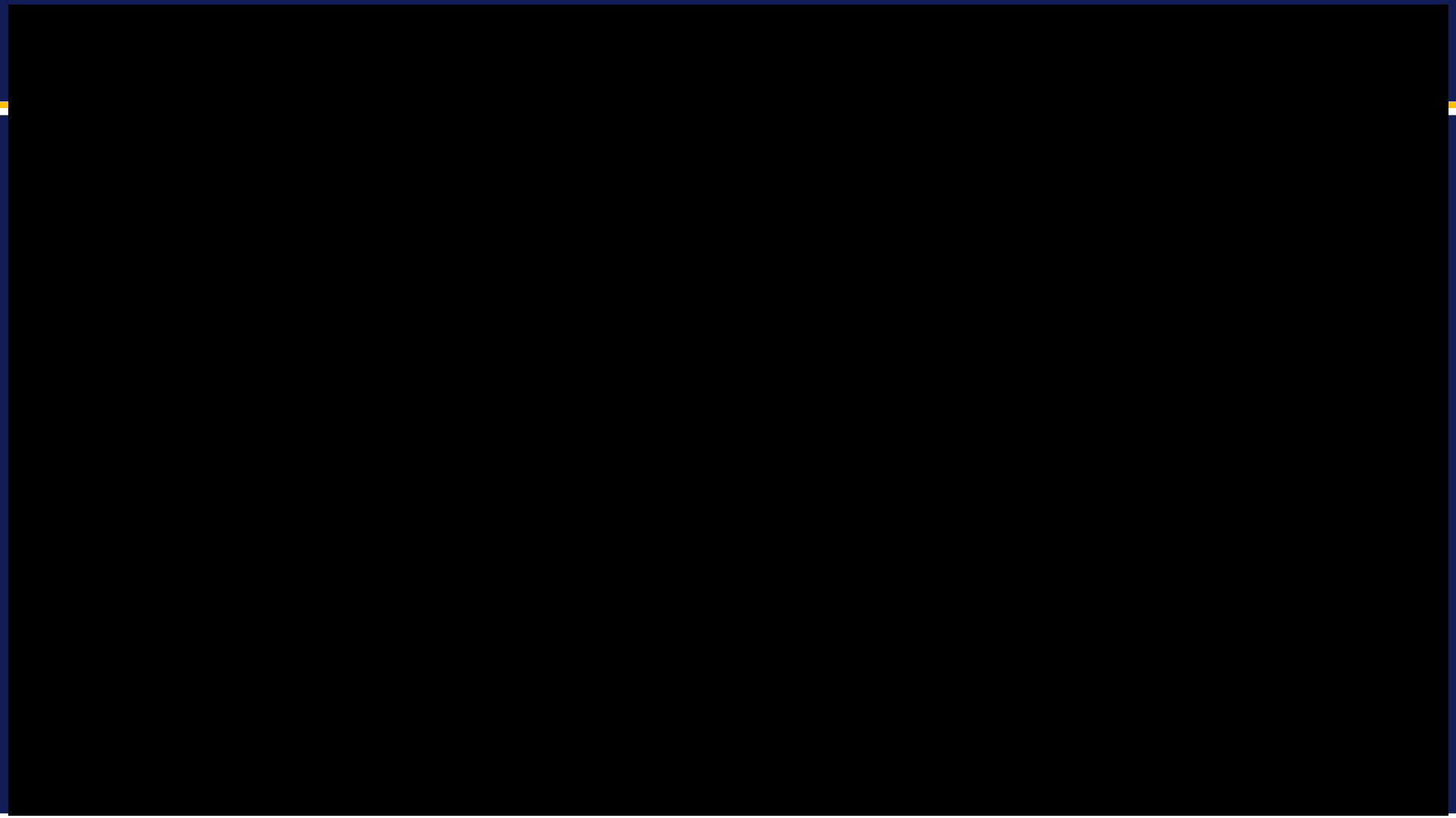
Real Birds!



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Birds Have Intrinsic and Cultural Value

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Birds Contribute Hundreds of Billions in Eco-services

Habitat Restoration

Pest Control

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Bird Watching: 40+ Billion Dollar Economic Engine

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Collisions are not rare

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Annual Mortality: North America

Collisions with	Date of reference	Mortality estimate
Buildings/glass	2014	1 billion
Cats	2013	2—4 billion

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Most Collisions are on Homes and Low-rise Buildings, not Highrises

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The Bird Activity Zone

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Mostly Songbirds:

migrating at night, colliding by day – WHY?

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Look Where You’re Going?

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What Causes Collisions?

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Glass or No Glass?

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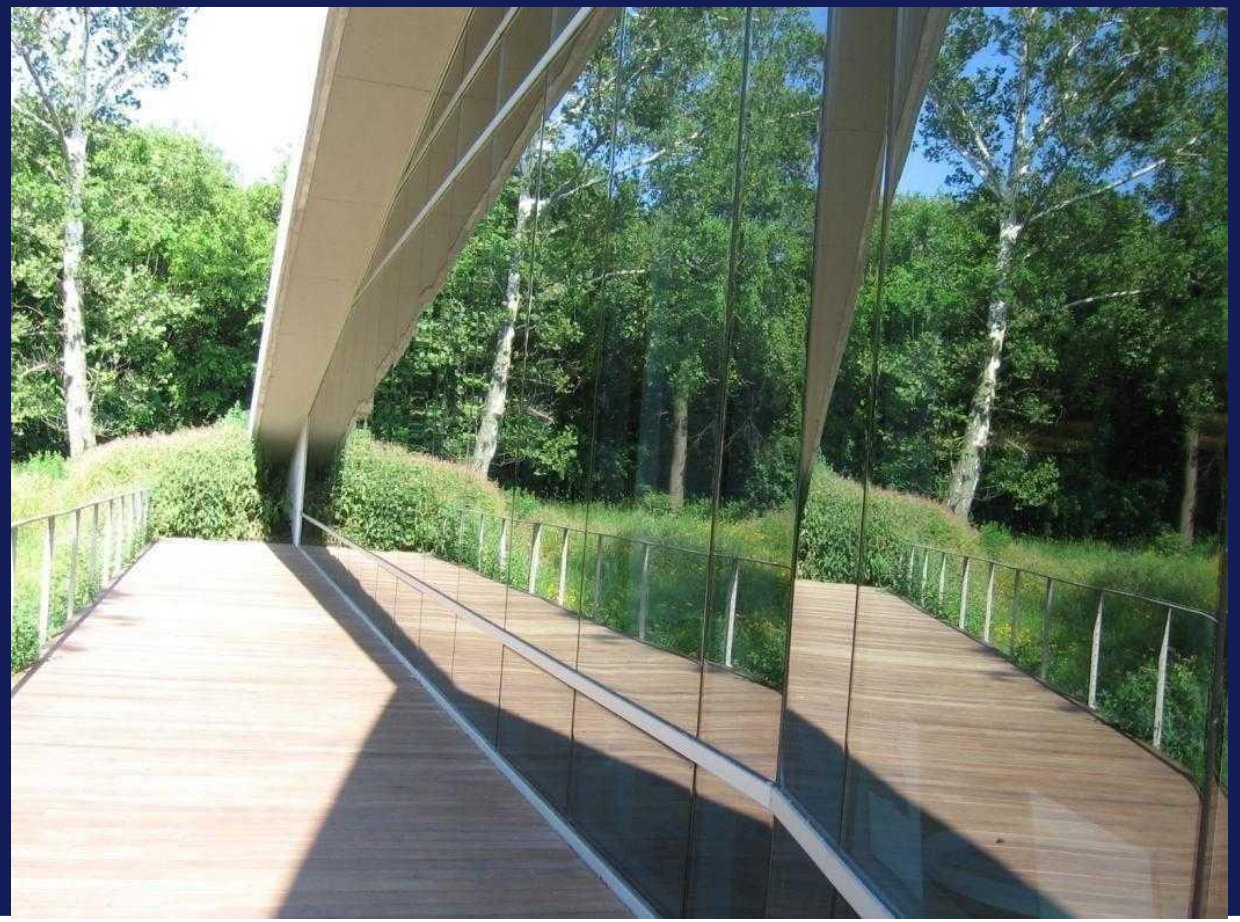
Birds Take What They See Literally

Birds Can’t Learn the Concept ‘Glass’



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Open Sky vs Cluttered Environment

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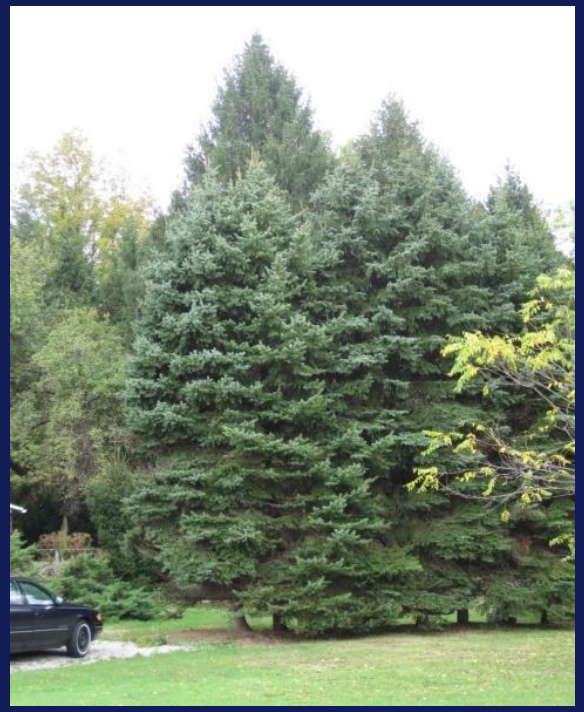
How to Stop Collisions: Get Birds to Swerve By Using Bird-friendly Glass

2 or 3 D signals
Proper Spacing -- 2”
Visible from 10’



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What's Bird-friendly Glass?

Evaluation Method #1: Tunnel Test – 'active' signals – Threat Factors

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Action!

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Fritted Glass, Surface Coverage 6%, TF= 17

Intuit HQ, Mountain View CA

UV Glass TF= 23

Vassar Bridge Science Building, Poughkeepsie

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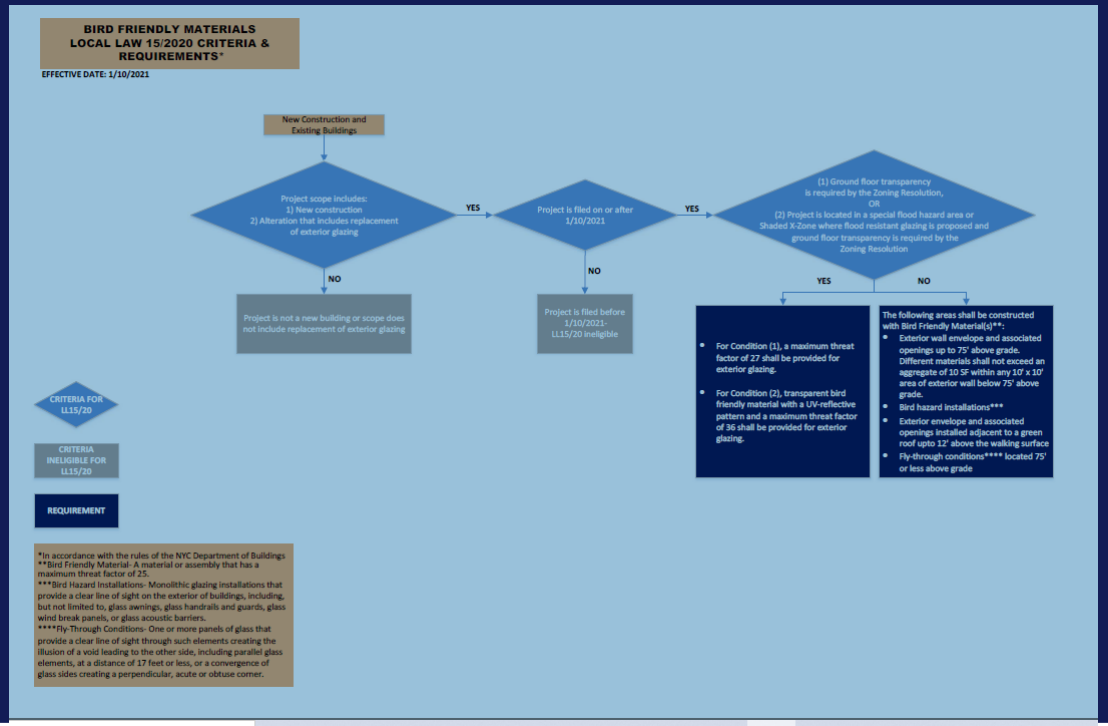
Evaluation Method #2: Compliance with Prescriptive Standard

- Simple example: surface 1 etch, maximum gloss level =18
- More complex: Flow Chart



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Insect Screen (not flush with glass) TF=1

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Evaluation Method # 3:Spandrel Glass: visual scale

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Evaluation Method #4: Computer Models

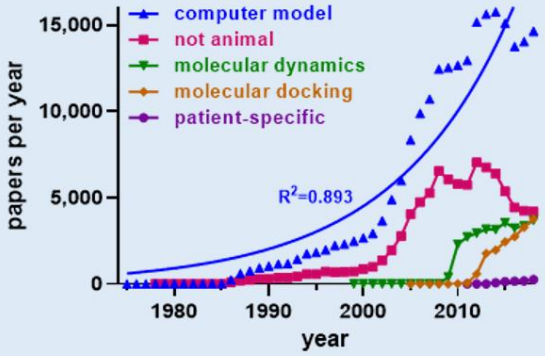

Figure 4 - Number of papers per year using computer models.
Data are the result of the following PubMed searches:

- "computer simulation"[MeSH Terms]
- "computer simulation"[MeSH Terms] NOT "animals"[MeSH Terms]
- molecular docking simulation[MeSH Terms]
- molecular dynamics simulation[MeSH Terms]
- Patient-Specific Modeling[MeSH Terms]

Correlation coefficient R^2 show the goodness of fit to an exponential growth function.

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How to Design a Bird-friendly Building

Strategies: Incorporate *from the beginning*

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

Bird-friendly Design overlaps with:

solar shading, glare control, distinctive design aesthetic, security, thermal control, energy efficiency and more

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Legislation, Ordinances and Guidelines

San Francisco, CA: Standards for Bird-safe Buildings
Oakland, CA: Bird Safety Measures
Alameda, Santa Cruz, San Jose, CA
Menlo Park, Emeryville, CA
Sunnyvale, CA: Standards for Bird-safe Buildings
Palo Alto , Richmond, CA
Minnesota: Buildings, Benchmarks and Beyond
Madison, WI
Cook County, Barrington, Chicago, Evanston, Highland Pk. IL
Howard Country, MD
Toronto, Canada: Bird-friendly Development Standards
Ontario, Canada: Environmental Protection Act, Species at Risk Act
Markham, Ontario
Portland, OR
Calgary, Canada
Arlington, VA
New York, New York

IN PROGRESS

Bird-safe Buildings Act, Federal
State of California, CalGreen
Berkeley
Washington, DC DOEE Green Code
State of Maryland
Canada, standard code for provinces

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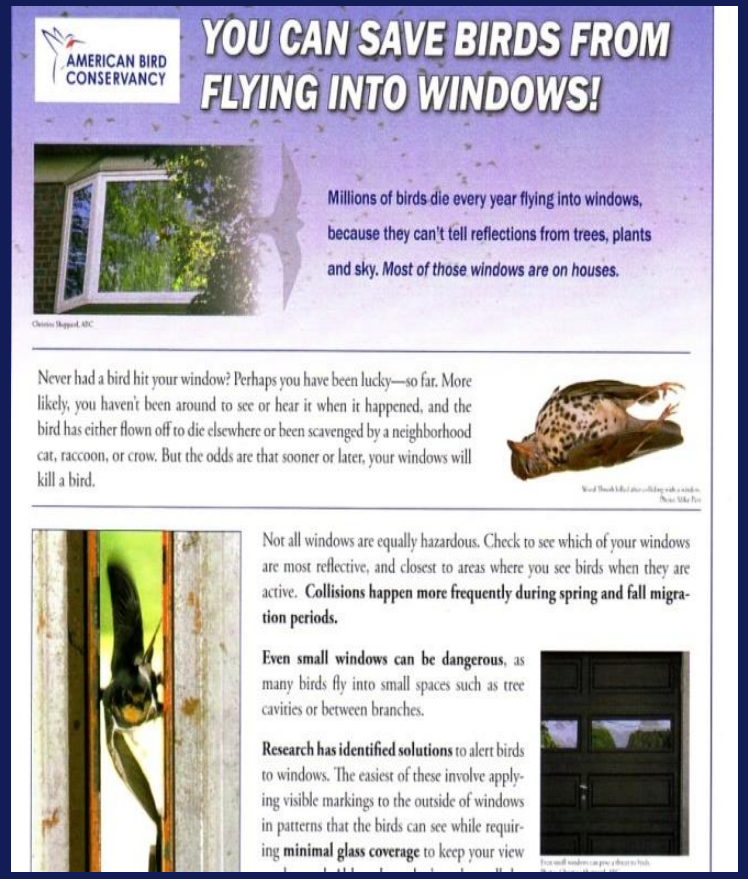
Resources: abcbirds.org birdsmartglass.org https://abcbirds.org/threat-factor-table



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YOU CAN SAVE BIRDS FROM FLYING INTO WINDOWS!

Millions of birds die every year flying into windows, because they can't tell reflections from trees, plants and sky. *Most of those windows are on houses.*

Never had a bird hit your window? Perhaps you have been lucky—so far. More likely, you haven't been around to see or hear it when it happened, and the bird has either flown off to die elsewhere or been scavenged by a neighborhood cat, raccoon, or crow. But the odds are that sooner or later, your windows will kill a bird.

Not all windows are equally hazardous. Check to see which of your windows are most reflective, and closest to areas where you see birds when they are active. **Collisions happen more frequently during spring and fall migration periods.**

Even small windows can be dangerous, as many birds fly into small spaces such as tree cavities or between branches.

Research has identified solutions to alert birds to windows. The easiest of these involve applying visible markings to the outside of windows in patterns that the birds can see while requiring **minimal glass coverage** to keep your view

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