SMASH THE CRASH

A Report on Bird-Window Collisions at the University of Rochester, v.1

OVERVIEW

Smash the Crash is a community initiative to study and prevent bird-window collisions at the University of Rochester. This report shares our findings as of March 14th, 2025, including which species have collided into buildings on campus and where. It also presents three of our recommendations for making the university a safer environment for birds.

CONTENTS

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BACKGROUND

Every year in the United States, up to 2 billion birds will die after colliding into windows and other glass features. Excluding habitat loss, this is the second leading cause of human-related bird death. These numbers are particularly troubling in light of recent estimates that the total population of breeding birds in North America has declined from 10 to 7 billion since the 1970s—a 30% reduction. Birds perform a number of key ecological and cultural services, and their loss would profoundly alter ecosystems around the world.

Collisions occur because windows are invisible to birds. Without the ability to rely on visual cues like right angles and door frames, birds collide into windows when they can see *through* windows to sky/habitat or see reflections of sky/habitat on the glass. Any bird is capable of colliding into glass: adults and juveniles, males and females, healthy and sick birds, and members of every species. Migratory birds, however, are particularly vulnerable, especially songbirds, such as sparrows, finches, and warblers. Collisions are usually fatal, and birds suffer from head trauma, brain hemorrhaging, and broken limbs, injuries that will kill them over hours, if not days.

At the University of Rochester, students, faculty, and other members of the community have witnessed bird-window collisions on campus for over four decades. Of the 165 different bird species that have been observed on university ground since 2014, including 2 species on the US Fish & Wildlife Service “Birds of Conservation Concern” List, 17 are known to have collided into our buildings. Observing a collision can be traumatic for anyone involved. Some students have tried to deal with the grief by collecting or burying the birds they have found. This is a mental health issue as much as it is an environmental issue for the university.

Bird-window collisions can happen anywhere birds and windows occupy the same environment, but several factors are known to increase the likelihood of collisions, such as the type, extent, and location of glazing; the presence of bodies of water and vegetation (for example, trees and shrubs); and the extent of urbanization and green space. Although UR is not known for its extensive glass architecture, its siting along the Genesee River, a common flyway for birds, as well as its abundance of trees make it a high-risk environment for all the millions of birds that travel through Rochester during spring and fall migration.

METHODS

Despite years of reports, there have been no systematic attempts to study the incidence of bird-window collisions at the University of Rochester. *Smash the Crash* was launched in September 2024 to address this knowledge gap. Combining scientific research with artistic creation and educational outreach, *Smash the Crash* is a community initiative to end bird-window collisions at UR. This builds on research being done at a minimum of 90 other universities around North America.

Based on existing models, we predicted that 716 birds will die every year on the River Campus—a calculation that takes into account the number of buildings (61) and the size (1-3, 4-11, and 11+ stories). This is a conservative estimate based on carcasses found, but most collisions don't leave a body. More often than not, injured birds will fly away, only to later succumb to their injuries, or they get eaten by scavengers like cats, rats, squirrels, and even groundhogs. This is one reason why most people are unaware of the extent of this problem.

Between September 23rd and November 8th, we conducted what is known as a "monitoring study." Following procedures elsewhere, we first selected a sample of 10 high-risk buildings based on anecdotal evidence, preliminary data, and expert assessment from bird-safe design consultants. Student researchers then patrolled these buildings during the early afternoon (1-3 PM) three times per week (Monday, Wednesday, Friday). They looked to find bird carcasses *after* collision, which mostly happens in the early morning, but *before* a scavenger could take them. Our goal for this study was to track the number of fall migration collisions on campus.

The buildings were selected were Rush Rhees Library, Wilson Commons, Rettner Hall, Sloan Performing Arts Center, LeChase Hall, Wegman's Hall, Goergen Hall, Computer Studies Building, Hutchinson Hall, and University Health Services.

Students photographed the carcasses they found for the purposes of species identification and recorded their location using Google Maps or other geolocation services. We stored our data in a spreadsheet and used ArcGIS to determine not just which buildings but which facades were most lethal.

FINDINGS

We have three main findings:

First, in our 21 days of study, we found and confirmed 58 collisions (2.8 per day), with the majority occurring in September and October. No collision victims were alive at the time of discovery. Assuming that songbird migration is roughly two months long (60d), we can infer that as many as 168 birds could collide into these 10 buildings during the fall migration season. This is to say nothing of the rest of the year or the remaining 51 buildings on the River Campus.

Second, we found 9 different species: 14 white-throated sparrows, 9 yellow-bellied sapsuckers, 3 song sparrows, 2 house sparrows, 1 swamp sparrow, 1 Tennessee warbler, 1 northern flicker, 1 white-winged junco, 1 rose-breasted grosbeak, and 25 bodies that were unidentifiable due to decomposition and disfigurement. As previously noted, these are 9 of 17 species known to collide with buildings at the University of Rochester. These findings are consistent with national data about the most vulnerable species.

Third, every building that we observed had collisions although some were more lethal than others. In order of lethality from high to low, these were as follows: Hutchinson Hall (16), Wilson Commons (8), LeChase Hall (8), the Computer Studies Building (6), Rettner Hall (5), Wegman's Hall (5), the Sloan Performing Arts Center (4), Goergen Hall (2), University Health Services (2), and Rush Rhees Library (2).

Not all buildings are uniformly dangerous, however; some facades are particularly dangerous. These "hotspots" include the Rush Rhees Library's and the Computer Studies Building's transparent skybridges; Hutchinson Hall up to the height of the surrounding tree canopy; Rettner Hall, particularly the connector to Morey and the ground-to-roof windows on the northwest corner; LeChase Hall, especially the north façade but also the panes on the east and west sides; the large glass atrium of Wilson Commons; and the "see-through" southeast corner of the Computer Studies Building.

RECOMMENDATIONS

To help prevent bird-window collisions at the University of Rochester, we propose the following three recommendations:

(1) Retrofit the following facades (ranked from highest priority to lowest) with collision deterrents:

A. All skybridges, including Rush Rhees Library and the Computer Studies Building
B. Hutchinson Hall
C. Rettner Hall, particularly the connector to Morey and the ground-to-roof windows on the northwest corner
D. LeChase Hall, especially the north façade but also the panes on the east and west sides
E. The large glass atrium on Wilson Commons
F. The southeast corner of the Computer Studies Building

Collision deterrents (such as window films, hanging cords, and acid-etched and fritted glass) generally follow what is known by the 2x2 rule: The window needs to have some form of visual "noise" or "interference" (i.e., markers) every 2 inches vertically and horizontally on the *exterior first surface* of the glass; it *cannot* be inside, or it will become less effective. There can be no gaps where this rule is not followed or birds will fly toward that gap. The markers must be at least ¼" thick, and they need to offer high visual contrast. What constitutes visual contrast will vary daily and seasonally based on the sun's position, the weather, and the angle of approach.

When followed properly, collision deterrents are *highly* effective, with over 90% efficacy (see here and here). A full database of 200+ effective products is maintained by the American Bird Conservancy; it includes brands like Feather Friendly (currently used at the University of Toronto), CollidEscape, Acopian Birdsavers (used at Cornell), and exterior nets, screens, and shutters), as well as glass from companies like Viracon (used at SUNY Brockport) and Guardian Glass (used at Western University). Local printing companies can also be used. Other effective geometric designs can be found here if you want to pursue a more custom solution.

The following have been shown to be ineffective: improperly spaced hawk decals, low-reflection tinted glass, angled panes, overhangs/awnings, and interior applications (i.e. curtains).

In addition to being highly effective, collision deterrents have additional benefits.

First, they often have very similar optical performance. They don't block views of the outside or negatively impact aesthetics looking inside. Most people aren't aware that windows have been treated with deterrents until they are told. Additionally, announcing

that windows have been treated can also send a positive message about steps that the university is taking toward sustainability and environmental action.

Second, they can be added in combination with other low-e coatings on surface 2 or 3, depending on the glass manufacturer. Bird-safety can be combined with climate-resilient measures. The exact effect on thermal performance will depend on the spacing of the markers and materials used, but in most cases, the treatments have little to no impact because the visual markers cover only a small proportion of the surface.

Third, they can be aesthetically pleasing, enhancing views of the local environmental and architectural conditions.

Fourth, some products even offer additional functionality, like privacy.

Our approach here follows trends toward bird-safe design at national, state, county, and municipal levels (see here) as well as at our universities. Among the University of Rochester's peer institutions (as defined by the Department of Education), nine have taken steps to implement bird-safe design through retrofits, including Northwestern, Duke, Emory, University of Chicago, Harvard, Washington University in St. Louis, Johns Hopkins, New York University, and Tulane. Among our neighboring institutions, Colgate, SUNY Brockport, the University of Toronto, and St. Lawrence have all retrofitted some of their buildings.

Retrofitting these buildings can be incremental. If you are planning to replace windows, you can incorporate these retrofits into future budget cycles, saving money on installation equipment and labor.

To summarize the next steps, we suggest the following:

A) Determine which facades to retrofit
B) Assess collision deterrent options in conjunction with façade study
    a. Acquire samples
    b. Consider visual contrast and thermal performance across daytime conditions and weigh with cost, aesthetics, and maintenance needs to determine the best fit for the university
    c. OPTIONAL: consult with Bird-Safe Consulting, a free service run by consultants with 20+ years of experience in making buildings bird-safe
C) Acquire quotes
D) Promote action through the American Bird Conservancy, Bird-Safe Consulting, and the US Fish and Wildlife Service, all of which will advertise universities that are taking steps to make their campuses bird-safe

(2) Allow students in Professor Mizin Shin's "Expanded Print Media" course to retrofit the Sage Art Center with bird-safe window films that they have designed

Student and faculty in Sage Art Center have reported bird-window collisions for years, particularly along the southeast corner of the building. In Mizin Shin's advanced printmaking course, students are designing bird-safe window films that will be printed on adhesive vinyl, cut, and applied to 12 panes. We have already shared their preliminary designs around the concept of "ecosystems," which Shin and Fadok individually reviewed and approved, based on their ability to deter collisions. We are currently in conversation with several local printing and install companies and awaiting quotes. The Genessee Valley Audubon Society has offered to help fund the installation.

This retrofit will not only save bird lives but will also help test the community's perceptions around bird-safe glass. Through the installation, which we intend to occur in mid-April (coinciding with Sage Fest), and two exhibitions in the spring and fall that will feature students' work, this project will help determine which bird-safe measures are best suited to our campus.

(3) Revise the university design standards to include bird-safe provisions on glazing

While retrofitting the existing building stock is essential, it is also important to ensure that future construction is bird-safe as well. For that reason, we recommend revising the design standards to include bird-safe provisions. This has precedent in design standard revisions at many of our peer institutions, including Yale, Penn, Cornell (restricted public access to the standards), and Princeton.

We recommend the gold standard put forth by the American Bird Conservancy: 100/100/100, that is, 100% of new buildings should be built using 100% bird-friendly materials in the first 100 feet above grade, including auxiliary structures and hazardous features. This standard builds on Yale's standards, which followed New York City's Local Law 15 (see here and here). Commentaries on national, state, county, and municipal bird-safe building policies often cite Local Law 15 as a model (see here and here).

Revising the design standards will not only save birds; it will also lower costs, add prestige, and uphold the university's commitment to Meliora.

First, costs: It is more cost-effective to include bird-safe measures early in the design process than it is later, whether this is through bird-safe glass or the minimization of glazing strategies that are, in additive, high in embodied carbon. As public demand for bird-safe design continues to grow, particularly in light of Local Law 15 as well as the "mass collision event" in Chicago last year, being proactive now will save money in the long run.

Second, following a "Bird Collision Deterrence" pilot credit, the US Green Building Council now offers an Innovation Credit. Meeting its guidelines affords the opportunity to achieve a higher ranking in their tiered credentialing system and publicly demonstrate the university's dedication to sustainability.

Third, we believe that incorporating bird-safe design into the university's architectural culture will help realize its commitment, as identified in the 2030 Strategic Plan, to Meliora, of making the world a better place.

FUTURE DIRECTIONS

Smash the Crash will continue to monitor the River Campus for signs of bird-window collisions. During spring migration (April through May), we will add more buildings to our patrols and sample more days of the week and hours of the day. We will also begin to monitor the Medical Center for bird-window collisions. We will inform you of our results at the start of June. We anticipate the need to add collision deterrents to more buildings.

We will also be organizing several educational outreach activities, including two exhibitions (one in April at the Art & Music Library and another in the fall at the Frontispace gallery), an arts workshop on May 5th with Holly Greenberg and Mizin Shin, a "nature walk" in early April, and a screening of the documentary *The Messenger* in the fall with director Su Rynard.