



Augustana College
Rock Island, Illinois
Habitat Restoration – Behavioral Ecology of Bird-Window Collisions

SCHOOL

Augustana College, private, 4-year, 2,500 students, Rock Island, IL, 61201

ABSTRACT

The underlying factors that affect avian community structure in urban landscapes include vegetation, season, and biotic and structural threats to survival. Bird mortality from window strikes is one human-related threat and may be correlated with the density of birds living around buildings. This contention has received little attention, and thus our objectives were to (1) examine the relationship between the timing of window victims and bird community structure at Augustana College, and (2) relate this to the behavior of window victims and non-window victims. We documented 66 species living around buildings in the winter, spring, and summer, and found that ~20% of these species died by window strikes. No mortality was observed in winter. Mortality was highest among the least abundant species (long- and some short-distance migrants) and lowest for the most abundant (permanent residents and other short-distance migrants). Window mortality in the spring tended to be composed of woodland species, whereas victims in the summer tended to be species preferring open woodland. Most species died during their respective migration times, but several also died for reasons related to age and flocking and territorial behavior. Our work suggests that the factors influencing window mortality are complex and varied, although an evaluation of behavior provided insight into why window strikes may have occurred.

GOALS AND OUTCOMES

Goals

We studied the behavioral ecology of bird-window collisions in spring 2006, winter 2006, and the summer 2009. Our goals were to (1) monitor three campus buildings for bird-window collisions, (2) measure the diversity of birds that live around campus, (3) borrow behavior information from the literature for all window victims, (4) determine the amount of window area at each building, and (5) measure the effects of scavengers on victim-removal below windows (fall and winter 2009).

The goals for the following years may continue to investigate these concerns and furthermore look at the relation between bird vision and the physics of light at windows. In addition, the future pursuit of preventive measures and the spreading of better public awareness of how our glass architecture can impact wildlife may be crucial to protecting threatened bird species.

Accomplishments and Outcomes

For Objective 1, we monitored the perimeters of the four campus buildings twice weekly for window victims. Any carcasses found within 2.5 meters were placed in a zip-lock bag, identified to species, and stored in a lab freezer. Inaccessible areas around buildings with non-vertical glass windows or confined by rooftops or dense vegetation were excluded from these surveys. Meeting Objective 2 required conducting weekly point count surveys, measuring for bird species abundance in range of a 50 meter radius on campus. We documented 66 species living around buildings for all seasons and found that ~20% of these species died by window strikes. No mortality was observed in winter. We rescued five

stunned window victims: Golden-crowned Kinglet, Chestnut-sided Warbler, Brown Creeper, Yellow-bellied Sapsucker, and Cedar Waxwing (see accompanying photograph). All flew away on their own power after the rescue.

We assigned categories of behavior to bird victims for Objective 3. These behaviors were: migration strategy, habitat preference, territoriality, degree of sociality, and breeding behavior. For example, if an Ovenbird died at a window in May, then we categorized these behaviors for Ovenbirds during migration. Moreover, if a Ruby-throated Hummingbird died in early June, then we assessed for this species those behaviors for the breeding season. Mortality was highest among the least abundant species (long- and some short-distance migrants) and lowest for the most abundant (permanent residents and other short-distance migrants). Window mortality in the spring tended to be composed of woodland species, whereas those in the summer tended to be species preferring open woodland. Most species died during their respective migration times, but several also died for reasons related to age and flocking and territorial behavior.

Objective 4 concerned tabulating and organizing the dimensions of all vertical windows. We used blueprints for all measurements, although some direct measurements were taken. Areas of all windows facing the inaccessible regions were not included in the analysis.

Objective 5 served as a way to assess the extent to which scavengers remove the window victims across time. Two carcasses (previously collected window victims at Augustana) were randomly placed around building faces of the three buildings monitored, as well as at a fourth building to increase sample size. Carcasses were checked daily for 14 days. Scavenger studies were completed in November 2009 and January 2010. During the January survey, a motion-sensitive camera placed at one carcass revealed that raccoons are one type of scavenger.

Most of window victims came from one building. It had both the largest number of long-distance migrants and most window area, roughly 5,000 squared meters. Scavengers had little effect on carcass removal at this building. In comparison, the other two buildings had almost 20% of the window area of the first and scavengers removed carcasses within only a couple days. Assumptions between bird age and likeliness of striking windows are further variables to investigate; juvenile American Robins have been quite prone to collisions during our summer surveys.

No new campus policies have since been enacted in reducing bird-window fatalities, although this study can provide a basis in how to analyze this complex problem and suggest an architectural consideration for wildlife.

Challenges and Responses

Besides having a few dead birds that were not identifiable and having to exclude certain sections from the data collection, there were relatively few problems with this study. Building and scavenger surveys took less than an hour to complete during the day and, thus, were not too time-consuming. Interpreting the results statistically was probably the greatest challenge, and organizing all the window measurement was especially time-intensive and frustrating.

Future studies would better benefit by having more scavenger surveys throughout the year and better communication with the college community and administration to spread awareness. The topic of bird-window collisions is not a very uplifting or popular subject, and many students, faculty, and staff appear to care little about it. By looking at this issue from a broad perspective (e.g., the effects of urbanization), we can see how our lives may affect bird communities and vice versa.

Campus Climate Action: Your School's Carbon Footprint

This project revolved around animal behavior and urban ecology, and did not directly address the issue of global climate change and actively reducing greenhouse gas emissions. However, it may have a positive indirect psychological impact. Since this study addresses the human impacts in constructing buildings with large window area, it can foster an atmosphere of empathy in the conservation community, which strives for sustainable practices with minimal damage to the natural world. In short, caring and understanding coupled with ecological research has a complementary ambition to how we address global issues like climate change.

Commentary and Reflection

One of the most important aspects of conducting research is to be prepared and ask as many questions as possible, then select the most relevant questions. Have a reason and purpose for choosing a research topic and never force yourself into anything you feel you cannot enjoy and give it your best. Since conservation has long been the passion of one of us (Dan) as a result of outdoor experiences in boy scouting (Scout Motto = "Be Prepared"), feeling self-motivated in doing this outdoor data collection through rain or shine was not a problem.

Next, be prepared to justify your research findings that refute the results of previous studies; this can promote better knowledge and discussion of the topic. Also, do not take personal the constructive criticism from others since it allows one to better justify results.

Finally, be prepared to make adjustments to research plans as new information unfolds. Our scavenger study was started rather late, but after finding a Morning Dove that was partially scavenged in the fall, we knew that a study had to be completed on this topic.

ENGAGEMENT AND SUPPORT

Leaders and Supporters

Experiences in boy scouting, college coursework in field biology, statistics, and computer sciences provided the tools for conducting this study. Almost the entire project came from self-advocacy and firmly communicating the findings and expectations. Besides family support, there have been many past influences in pursuing positive and sustainable lifestyles. The enthusiasm of contemporary naturalists like Steve Irwin, the services in scouting started by Lord Baden Powell, and the observations of Aldo Leopold were all integral to my purposefulness in this study.

Funding and Resources

There were few expenses and no funding for this project or support through NWF Campus Ecology Fellowship. This research only required access to a laboratory with a freezer (for bird carcasses), computer with spreadsheet software, measuring tape, sticky notes, data sheets, and many zip-lock bags/grocery bags and much patience.

Education and Community Outreach

We presented the results of this work at 70th Midwest Fish and Wildlife Conference, 6-9 December 2009, Springfield, IL (available from: <http://dnr.state.il.us/Midwest/abstractPDF/EMBASSYROOMtuesday.pdf>), and at the Augustana College *Celebration of Learning* research fair in May 2010 (available from: <http://www.augustana.edu/x12116.xml>).

National Wildlife Federation's Campus Ecology Program

The Campus Ecology program provided an online outlet for us to present our research findings. Thus, it challenged us to clearly and concisely report the results of this project in a timely fashion.

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MORE ABOUT YOUR SCHOOL

Campus Sustainability History

“Augustana College is striving towards sustainability through its academic programs and institutional policies. In 2007, the Augustana College Board of Trustees approved a broad and ambitious action plan in an effort to reduce the college's environmental footprint. A central point of this plan was the establishment of the Campus Sustainability Committee, composed of students and members of the faculty and staff. This committee oversees and helps facilitate numerous activities on campus, including recommendations of institutional policies. In addition, Global Affect, a long-standing student organization, supports numerous environmental activities on campus.” (<http://www.augustana.edu/x11531.xml>)