Factors Influencing Risk of Collisions for Birds with Buildings

Multiple, interacting factors influence the risk of glass collisions that a given building poses to birds (Hager, 2008; Hager et al., 2013). Klem et al. (2009), looked at architectural and landscape variables for 73 buildings in Manhattan (New York) and concluded that the amount of glass on a façade was the best predictor of mortality, with a 10% increase in glass correlating with an increase in collisions of 19% or more (depending on season). Cusa et al. (2015) also found a strong relationship between amount of glass and number of collisions on buildings in Toronto.

In a meta-analysis of data from monitoring programs and other sources, Loss, et al. (2014) calculated overall annual mortality, combining all building classes, as between 365 and 988 (median 599) million birds killed annually in the United States. Different types of structures were associated with different rates of mortality, with a median mortality rate of 2.1 birds per home, 21.7 birds per structure for low rise buildings (4-11 stories), and the highest median rate of 24.3 bird collisions per building for high rises. Note, however, that the increase from low rise to high rise rates is low – presumably because most collisions on high rise structures occur on the lower floors.

Obviously, for determining policy, it would be useful to have data on the amount of glass on each structure for which data was used, or to be able to translate collisions per building into collisions per unit measurement of building footprint or façade area, but these data are not available. Comparing the rates for low rise and highrise buildings indicates that floors above 14 may contribute relatively little to overall mortality

It is difficult for collisions monitors to know precisely where on a façade a collision occurs, as birds may bounce or fly away without leaving a mark (Klem, 2009). However, monitors able to view setbacks and roofs report bird carcasses that would not be tallied by more typical monitors restricted to ground level. Collisions on higher levels of buildings may thus be underestimated. However, a large, multi-site study by Hager et al. (2017) also called out low rise buildings, especially those in suburban areas like office parks.

The habitat immediately surrounding buildings bears directly on collisions likelihood – vegetation and other resources draw birds and so do their reflections. Aquatic habitats, like stream banks, lakesides and marshes are especially productive, and birds are attracted to areas with water, both during the day, and as they end migration stages at night (Bonter et al., 2008).

Studies have repeatedly found that glass that reflects vegetation, up to top tree height, is more likely to cause collisions (Gelb and Delacretaz, 2009; Gelb and Delacretaz, 2006; Klem et al., 2009; Kummer et al., 2016; Liu and Yanchun, 2017). Agudelo-Alvarez et al. reported that situations where vegetation was seen through glass caused more collisions than simple reflection – perhaps because much reflective glass can vary significantly in reflectivity throughout the day.

4301 Connecticut Avenue, N.W., Suite 451 ● Washington, D.C. 20008
Tel: 202-234-7181 ● Fax: 202-234-7182 ● info@abcbirds.org ● abcbirds.org

Buildings that reflect vegetation are an issue but it is more complex than that – vegetation is a proxy for the activity zone of birds, because birds spend the majority of their time where resources like food, shelter, perching and roosting sites are available. But, birds may also want to fly over vegetation in reflected sky, or around a structure, in reflected habitat. Different heights above the ground have been used in legislation and guidelines as proxy for the zone where birds are most active, including 60 feet (see San Francisco and Toronto standards), 75 feet (New York City) and 40 feet (LEED).

REFERENCES

Agudelo-Álvarez, Laura, Johan Moreno-Velasquez & Natalia Ocampo- Peñuela, 2010. Colisiones De Aves Contra Ventanales En Un Campus Universitario De Bogotá, Colombia (Collisions of birds with windows on a university campus in Bogotá, Colombia). Ornitología Colombiana No. 10 (2010): 3-10.

Bonter, David N., Sidney A. Gauthreaux Jr., And Therese M. Donovan, 2008. Characteristics of Important Stopover Locations for Migrating Birds: Remote Sensing with Radar in the Great Lakes Basin. Conservation Biology, Volume 23, No. 2, 440–448. DOI: 10.1111/j.1523-1739.2008.01085.

Cusa, Marine, Donald A. Jackson and Michael Mesure, 2015. Window collisions by migratory bird species: urban geographical patterns and habitat associations. Urban Ecosystems doi:10.1007/s11252-015-0459-3)

Gelb, Y. and N. Delacretaz, 2009. Windows and Vegetation: Primary Factors in Manhattan Bird Collisions. Northeastern Naturalist 6(3):455–470.

Gelb, Y. and N. Delacretaz. 2006. Avian window strike mortality at an urban office building. Kingbird 56(3):190-198.

Hager, S.B., H. Trudell, K.J. McKay, S.M. Crandall, L. Mayer. 2008. Bird density and mortality at windows. Wilson Journal of Ornithology 120(3):550-564.

Hager SB, Cosentino BJ, McKay KJ, Monson C, Zuurdeeg W, and B. Blevins, 2013. Window Area and Development Drive Spatial Variation in Bird- Window Collisions in an Urban Landscape. PLoS ONE 8(1): e53371. doi:10.1371/journal.pone.0053371 http://people.hws.edu/cosentino/publications_files/PLoS%20ONE%20201 3%20Hager.pdf

Hager, Steven B. et al., 2017. Continent-wide analysis of how urbanization affects bird-window collision mortality in North America. Biological Conservation 212: 209-215
http://dx.doi.org/10.1016/j.biocon.2017.06.014

Klem, D. Jr., C. J. Farmer, N. Delacretaz, Y. Gelb and P.G. Saenger, 2009. Architectural and Landscape Risk Factors Associated with Bird-Glass Collisions in an Urban Environment. Wilson Journal of Ornithology 121(1): 126-134.

Kummer, Justine A., Erin M. Bayne and Craig S. Machtans, 2016a. Use of citizen science to identify factors affecting bird–window collision risk at houses. The Condor, 118(3):624-639. DOI: http://dx.doi.org/10.1650/CONDOR-16-26.1 URL: http://www.bioone.org/doi/full/10.

Liu, Hui and Xu Yanchun, 2017. Bird Collision with Building Glass Outer Wall Caused by Landscape Structure: a Case Study; College of Wildlife Resources, Northeast Forestry University; Chinese Journal of Wildlife, 2014-02

Loss, Scott R., Tom Will, Sara S. Loss and Peter P. Marra, 2014. Bird–building collisions in the United States: Estimates of annual mortality and species vulnerability. Condor 116:8-23. DOI: 10.1650/CONDOR-13- 090.1