Low to No Cost Measures for Reducing Bird Impacts at Federal Facilities

Measure	Additional Information
	
Procedural and Operational	
1. Encourage all staff to turn off interior building lighting at night, especially lighting in offices with exterior windows.	These measures will reduce bird attraction and provide energy and cost savings. Daytime cleaning may also result in salary savings by eliminating nighttime overtime cleaning costs.
2. Clean Federal buildings during the daytime.	
3. Use timers to extinguish exterior vanity and celebratory lighting early at night (e.g., 10 pm), especially during periods of peak bird migration and inclement weather.	Birds traveling at night are drawn towards lights and circle endlessly until dawn, resulting in exhaustion and mortality. Bad weather (specifically fog and cloud cover) potentially increases the risk of mortality incidents.
4. Keep shades or blinds half open during the daytime and closed at night, especially during periods of peak songbird migration and breeding.	Shades or blinds, especially those light in color, effectively make glass more visible, and reduce the mirror effect for birds during the day.
5. Move house plants, trees and shrubs away from clear glass windows to decrease the illusion to birds of clear air space and safe refuge (FLAP 2014, Audubon Minnesota 2013).	If you can see the plants from outside of the building, so can the birds, and they may attempt to fly toward them.
6. Work with landscape planners to make exterior plant placement most bird-friendly, using the best planting, gardening and horticultural practices for exterior greenery (FLAP Canada 2014, Audubon Minnesota 2013).	Bird-friendly landscaping recommendations can be found in many of the bird-friendly building design guidelines developed in North America; for example, the New York City and Minnesota Audubon Bird-Safe Building Guidelines (New York City Audubon 2014, Audubon Minnesota 2013).
7. Place bird feeders <3ft (e.g. with a suction cup design directly on window glass) or >30ft away from windows (Klem 1990, Klem et al. 2004, Veltri and Klem 2005, Cornell Lab of Ornithology 2014, FLAP 2014, Audubon Minnesota 2013).	If the feeder is less than 3 ft. away, birds can generally not gain enough momentum to cause serious harm to themselves if a collision occurs. Alternately, if feeders are at least 30 feet away the likelihood that they will collide with windows is largely reduced.
Structural and Equipment	
1. Control office lights with timers, photovoltaic, infrared, or motion-sensor devices.	This will reduce bird attraction and provide energy and cost savings.
2. Where window shades or blinds are planned for new construction, install white or light-colored shades.	Shades; especially light-colored shades work to break up the glass to make it more visible to birds.
3. Where pilot warning and obstruction lighting or antennas are placed on building roofs, use bird-safe lighting recommendations. Replace any steady-burning red (L-810) obstruction lights with L-864 blinking incandescent red light, or red or white strobe or strobe-like lighting (Gehring et al. 2009, 2011). Determine if lighting can be permanently extinguished or not used on future construction. Where blinking or strobed obstruction lighting must be used, ensure lights are of the minimum lumen intensity to	Eliminating lighting all together where feasible is ideal and provides energy and cost savings. For blinking or strobed lighting, minimum lumen intensity is considered to be < 2,000 candela [cd]) and maximum "off" phased (3 seconds between flashes, 0.2 seconds "on"-time per flash). Check with the Federal Aviation Administration (FAA) for any necessary lighting variances.
4. Where exterior lighting must be used, avoid using bright white or other bright, unshielded lighting fixtures and ensure all lights are down-shielded to be dark-sky compliant.	Examples of bright white or other bright, unshielded lighting fixtures include quartz, halogen, or sodium lighting. Down-shielded lighting should be dark-sky compliant. As a rule of thumb, fixtures should not emit light at a vertical angle > 90 degrees directly down from the light fixture.
5. Where external lights are not needed turn lights off early (e.g. 10 pm) or ensure automatic shut-off via use of timers.	Shut off should occur from at least midnight to 6:00 am local time.
Markers and Cues	
1. Visibly mark glass where collision risk is high (e.g. glass is free-standing and clear, such as on a skywalk; highly reflective of vegetation - especially tall vegetation; transparent with visible trees or plants inside; or very close to fruited trees or shrubs that attract birds). There are multiple ways you may assess your building risk and identify specific problem areas for solutions, such as talking with a local biologist or contacting a local or national organization with expertise on this issue (e.g., The Fatal Light Awareness Program (FLAP) at: http://www.flap.org/bird-safe-consulting.php). Bird collisions can be avoided if the birds are visually cued to the presence of glass, either through cues/deterrents that are visible to the human eye or through ultraviolet cues visible only to birds. The resultant contrast must be visible to the majority of bird species.	**Some examples of inexpensive but effective cues/deterrents that have been tested and are available commercially:** (1) decals (circles or squares); (2) stickers: (3) mylar strips vertically or horizontally placed; (3) WindowAlert; (4) CollidEscape Clear or CollidEscape Standard window film; (4) ABC window tape vertically or horizontally oriented, Bird Friendly Film; (5) Solyx Custom Bird Strike Film; or (6) vertically hanging strings known as BirdSavers (Klem 2009). **Proper application of cues and deterrents:** Visual markers should be installed on the exterior portion of windows/facades and spaced at intervals of no greater than 2" vertically or 4" horizontally (Klem 2009). Decals should be no smaller than 0.125 inch width, for circles a minimum of 0.25 inch diameter, for squares a minimum of 0.25 x 0.25 inch dimensions. 2 x 2inch dimensions are optimal. Window marking/deterrent applications need to be installed on the exterior windows, preferably for the first 52 feet above ground level, typical of the height of the average city tree reflection (City of Toronto 2007, Klem 2009, FLAP 2014).

Low to No Cost Measures for Reducing Bird Impacts at Federal Facilities

Measure	Additional Information
2. As a short-term solution where collisions are problematic, soap the exterior windows or leave windows un-cleaned until better and more long-lasting deterrents can be installed (FLAP 2014, Cornell Laboratory of Ornithology 2014)	Leaving windows un-cleaned or clouded reduces reflection and transparency of the windows and makes them more visible to birds.
Barriers	
1. Where bird-window collisions are prevalent or are expected to be a problem (e.g. glass is free-standing and clear, such as on a skywalk; highly reflective of vegetation - especially tall vegetation; transparent with visible trees or plants inside; or very close to fruited trees or shrubs that attract birds)**, but where decals/deterrents are not feasible, install site-specific physical barriers such as taught small-mesh crop netting or window screen.**	Install netting, screen, or other barriers at least 2-3 inches from the glass. Netting should be taught enough that birds bounce off, but small enough (no > 0.6 inch diameter netting) to avoid entanglement. Use window frames or other framing structures to securely hold the netting (Cornell Lab of Ornithology 2014, FLAP 2014).
Habitat	
1. Impacts to important bird habitats should be carefully assessed where immediately adjacent to proposed Federal building sites.	Important bird areas may include wetlands, rookeries, historic roost sites, key feeding areas, federal wildlife refuges, parks and land management areas, Important Bird Areas, and others. Locations of many of these areas, can be viewed online at sites like the USGS Protected Areas Viewer at: http://gapanalysis.usgs.gov/padus/viewer/. Regional Migratory Bird Program Offices may have specific advice and recommendations for your location. The USFWS lists local contacts on the "Regional Office" drop down at: http://www.fws.gov/migratorybirds/ContactUs.html
2. Make glass around gardens and green roofs bird-friendly where specific bird-window collisions are prevalent or are expected to be a problem (e.g. glass is free-standing and clear, such as on a skywalk; highly reflective of vegetation - especially tall vegetation; transparent with visible trees or plants inside; or very close to fruited trees or shrubs that attract birds).	Refer to "Markers and Cues" and "Barriers" sections above for recommendations.
Monitoring	
1. Implement a monitoring program to help identify problem areas around your facilities and nearby facilities.	Logging this information in a database will help you track and identify patterns in mortalities surrounding certain infrastructure and locations. There are several already existing database options (e.g., the Wildlife Health Event Reporter at: http://www.whmn.org/wher)
Education	
1. Educate others by sharing information about low-cost solutions to creating bird-friendly buildings.	Educational activities can include the distribution of materials like this information sheet to help others know the simple things they can do to minimize and prevent bird fatalities around their buildings.

References and Resources

Audubon Minnesota. 2013. Birdsafe Buildings. Project Birdsafe, related links: http://mn.audubon.org/birdsafe-buildings. National Audubon Society.

City of Toronto. 2007. Bird friendly development guidelines. City of Toronto Green Building Standards. www1.toronto.ca/.../city_planning/zoning__environment/files/pdf/development_guidelines.pdf. 42 pp.

Cornell Lab of Ornithology. 2014. Make your windows safer for birds. www.birds.cornell.edu/bbimages/gbbc-email/safewindows.pdf

FLAP Canada. 2014. Bird-building collision reduction: strategies for architects, developers, building owners and managers. http://www.flap.org/commercial.php. Fatal Light Awareness Program, Toronto, Canada. Originally published 2007. 42 pp.

Gehring, J.L., P. Kerlinger, and A.M. Manville, II. 2009. Communication towers, lights and birds: successful methods of reducing the frequency of avian collisions. Ecological Applications 19505-514.

Gehring, J.L., P. Kerlinger, and A.M. Manville, II. 2011. The role of tower height and guy wires on avian collisions with communication towers. Journal Wildlife Management 75: 848-855.

Klem, D., Jr. 2009. Avian mortality at windows: the second largest human source of mortality on earth. Pp. 244-254 In T.D. Rich, C. Arizmendi, D. Demarest, and C. Thompson (eds.). Tundra to Tropics: Connecting Birds, Habitats and People,

New York City Audubon. 2014. Bird-Safe Building Guidelines. http://www.nycaudubon.org/our-publications/bird-safe-buildings-guidelines