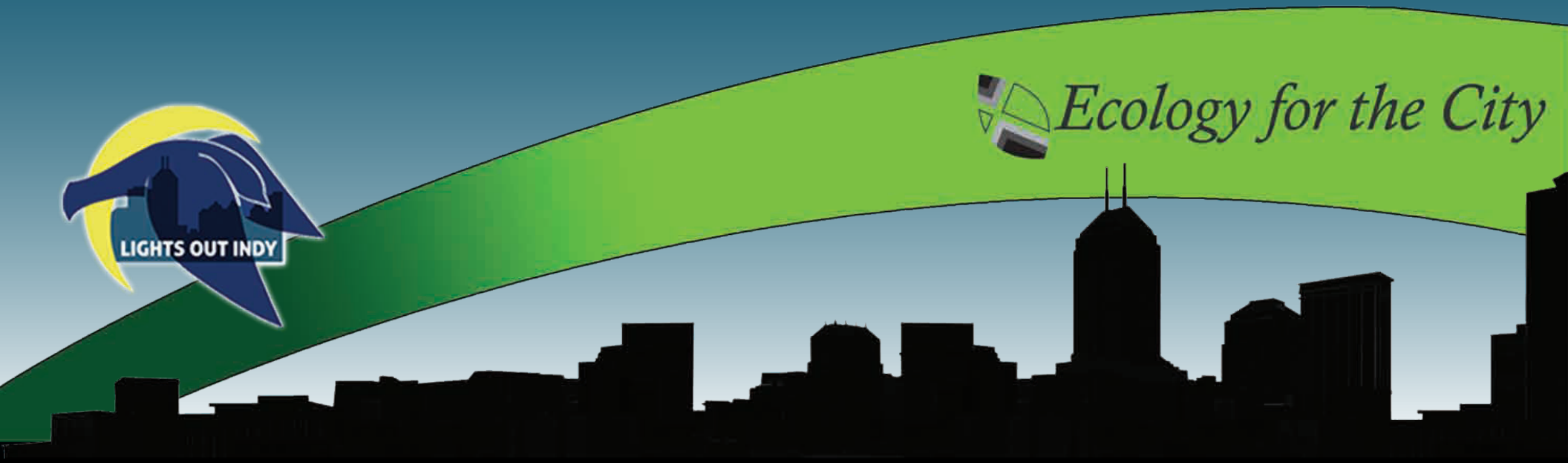
KILL the LIGHTS



Prepared for:
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The Environmental Practicum Course
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I. Project Overview

This report was prepared by the Fall 2010 Environmental Practicum course. Class participants include the following nine students: Andrew Banks, Caroline Bloemker, Ashlee Cerda, Robbie Foote, Benjamin Macias, Duwan Morris, Hal Oberholzer, Chris Siegel, and Howie Wiesjahn.

In September 2010, the class met with Don Gorney, President of the Amos W. Butler Audubon Society a non-profit organization based in Indianapolis. Gorney is also head of the Lights Out Indy (LOI), an initiative concerned with window strikes and energy consumption. Focusing its efforts on downtown Indianapolis, LOI urges building owners and managers to reduce lighting between midnight and dawn. As a non-profit with limited funding, LOI relies heavily on volunteers for its efforts. Don expressed concern over building participation, outreach efforts, public engagement, data collection and architectural design.

The class followed a basic inventory, analysis and synthesis process meant to provide students with a broad background in the subject and provide opportunities for interaction with local professionals. The ultimate hope is that the class findings and report will help LOI further its mission, work towards increasing participation, and provide recommendations to increase its participation.

This semester students were also required to maintain a "blog" for the duration of the semester. Each student posted biweekly entries on a designated days of the week. The blog offers insight into the students' thoughts and opinions on the course and topics relevant to the course. The blog may be followed at http://butlerpracticum2010.wordpress.com/.

II. Introduction

As mentioned previously, LOI is an initiative of the Amos W. Butler Audubon Society, a non-profit organization based in Indianapolis. The goal of LOI is to reduce bird mortality due to building collisions and decrease energy consumption in the Indianapolis Metro area. Focusing most its efforts on downtown Indianapolis, LOI encourages building owners and managers to dim or extinguish internal lighting, and extinguish decorative architectural lighting between midnight and dawn, particularly during peak migration periods. This measure not only reduces the number of avian window strikes, but reduces energy consumption.

The Environmental Practicum Fall 2010 course is comprised of nine junior and senior Butler students majoring in biology or science, technology and society. The goal of the course was to help LOI further its mission and ultimately improve participation. This includes increased public participation an citizen science, as well as private participation by building owners and managers.

Problem Statement

LOI highlights the important issue of bird mortality due to building collisions in downtown Indianapolis. Birds rely on stars to navigate migration routes at night. It is believed that lighting from large buildings disrupts this navigation and results in birds striking sky scrapers (Banks). Given this overall issue and the mission of LOI, the problem for a non-profit that relies on volunteer and community support as its main resource is that the general public, building owners, and building designers are under-educated about the effects internal building and architectural lighting has on migratory birds. Other groups in the class have been looking into building management and reduced lighting, as well as architectural design. Examining building management in Indianapolis was important to try and identify reasons for low participation rates. Additionally, it will increase the understanding of incentives that could gain more support from buildings that have not implemented LOI. Also, architects were contacted for more information about design principles and practices, and how they can be implemented from the ground up, literally. If the buildings were built with migration in mind then there would not be a problem to begin with. Understanding adequate ways of design and construction not only help now, but also the future by making bird friendly design decisions.

LOI seeks a long term plan to further its mission. It is the goal of the Environmental Practicum Fall 2010 class to assist LOI in these efforts and improve participation. The first phase of the course focused on LOI and developing an understanding of the problems it faces through research and guest speakers. Speakers covered a spectrum of topics including basic bird identification techniques, effective marketing, and utilizing mobile technology in citizen science pursuits.

Furthermore, each student conducted a case study of an existing non-profit conservation group, analyzing their methods, marketing, and evolution. These studies, included in Appendix A, offer valuable insight into LOI's potential growth and how this growth may come about. The information gleaned from these studies was discussed by the class, along with issues that Don Gorney identified as important or necessary for LOI. Based on this analysis and discussion the class divided into three groups: the design group, the building management group and an outreach group.

Groups

The goal of the design group is to investigate different concepts in green building architecture, or, more specifically, to examine and consolidate research and design concepts that make migratory birds safer. These elements include types of windows, lighting patterns, lighting colors, and window shapes. Using the information gathered, the design group investigated current the LEED certification process and consulted experts in the field of architecture.

The building group's focus is, first, determining the most sensible targets for the study. After determining these targets, the group worked to develop an effective strategy pertaining to approaching the "key individuals" in each case (building managers, building owners, other stakeholders). A main part of the group's approach will be designing attractive incentives to help boost participation in LOI. For example, media (newspaper, radio) recognition of a company's/building's participation in LOI would make the notion of participating all the more enticing. Overall the building group hopes to gain a better understanding of the complexities of the issue of potentially participating in LOI, and to convey these findings to LOI.

The outreach group focused on citizen science, social media and general public outreach. This group focused on public outreach mechanisms that would highlight the mission of LOI to a large group of people with a minimal amount of effort. Since LOI relies so much on community support, this was deemed necessary to educate residents of the greater Indianapolis area about LOI.

III. Background

Context

For the purpose of this report, "bird" or "birds" will refer to any species that, in the course of their annual migration traverse the city of Indianapolis. This includes not only long distance migratory species, but also short-distance migrants and resident species.

Indianapolis is the 14th largest city (based on population) in the U.S. It is centrally located in Indiana, which lies on the eastern edge of the Mississippi Flyway for migrating birds (Figure 1). The Mississippi Flyway runs along the Mississippi River Corridor. Tall buildings located along migratory corridors pose a particular hazard to birds because of their height and the amount of night lighting emitted by such structures. Table 1 lists the 20 tallest buildings in Indianapolis and they are displayed spatially in Figure 2.

Indy will refer to downtown Indianapolis with the following boundaries: South of I-65, West of I-70, North of South Street and East of Dr. Martin Luther Kings Jr. Street. This area is illustrated in Figure 3. This distinction was made for ease of reporting and in an effort to keep the class focused on a specific area. It also encompassed a the denser part of the downtown area, is close to the White River and included 19 of the 20 tallest buildings identified for Indianapolis. It should be noted that the greater Indianapolis area also experiences bird collisions, but the class chose to focus on a specific area of Downtown Indy.

LOI also has four participating buildings: The Indianapolis Museum of Art, The Indianapolis-Marion County Public Library, The NCAA Hall of Champions, and the State of Indiana Forensic and Health Sciences Lab. However, upon spatial analysis only two of these participants are located within the urban downtown area, and only one is located within the class identified study area (Figure 4). Additionally, none of these buildings are identified within the 20 tallest buildings. The Library building is known to experience many bird strikes, but their participation has been very valuable to LOI. The other buildings are iconic and well visited in Indianapolis, so their participation is also highly valuable due to public visibility.

Table 1: Twenty Tallest Buildings in Indianapolis

BUILDING	LOCATION	HEIGHT	FLOORS
Chase Tower	111 Monument Circle	247 m	49
One America Tower	1 American Square	162 m	38
City-County Building	200 E. Washington St.	133 m	28
Market Tower	10 West Market St.	128 m	32
300 N. Meridian	300 N. Meridian St.	124 m	28
M and I Plaza	135 North Pennsylvania St.	122 m	31
Amerimar	101 West Ohio	110 m	22
AT&T	220 N. Meridian St.	98 m	22
Capital Center South	201 N. Illinois St.	95 m	22
Hilton Indianapolis	120 W. Market St.	92 m	18
Riley Towers I	650 N. Alabama St.	90 m	30
Riley Towers II	650 N. Alabama St.	90 m	30
Conrad Indianapolis	50 W. Washington St.	87 m	23
AT&T 220 Building	220 N. Meridian St.	87 m	23
Market Square Center	151 N. Delaware St.	86 m	20
Hyatt Regency/ Nat'l City Center	1 South Capitol Ave.	82 m	22
Simon Property Group	225 W. Washington St.	79 m	14
Fifth Third Bank Tower	251 N. Illinois St.	75 m	17
Barnes and Thornburg Building	11 S. Meridian St.	75 m	17
8888 Keystone Crossing Building *	8888 Keystone Crossing	70 m	18

** Not located in downtown Indy*

IV. Design

Introduction:

The increased amount of bird deaths due to window strikes has been heavily viewed by scientific researchers in the field. Researchers have suggested that every building the United States leads to 1-10 avian mortalities per year (Klem). Although it is more common to see bird deaths in urban area due to the increased density of taller buildings, it can also be seen in areas of less dense building structure seen on college campuses such as Butler University. Due to the increased amount of bird strikes on window buildings during migration periods, building design has become a problem in terms of how to make a building more bird friendly, how to provide a basis of building design through a rating system, how to educate building designers in new strategies, and how to create an incentive for innovative ideas in designs that contribute to lessening bird deaths.

Building design technique is a critical element to initiatives like LOI. Thinking creativity about design elements can lead to bird friendly buildings including the materials used as well as the other elements such as architectural lighting and outside landscaping. The goal of this group is to educate designers and building managers regarding the role architectural elements and lighting play in window strikes. Specifically focusing on window treatments, architectural lighting, and overall outside landscaping features. This investigation includes options like LEED certification, energy efficiency, as well as window treatments and placements that lower the risk of bird strikes within the migration flyway.

The group anticipated several issues that deter the promotion of bird-safe building design. These issues include the effective communication between designers and architects in the Indianapolis area and the costs associated with initial development and changes towards eco-friendly materials. Lastly, anthropogenic and aesthetic values are major influences on building design and may limit the environmental impact. Flaws of the group included a limited number of personal resources that were available to talk as well as having an ill-understanding of the Indianapolis city regulations for buildings. The group was able to overcome these obstacles by further research as well as using a basic guideline provided by the Minnesota Audubon Society.

Inventory:

Conducting an inventory of elements and tools is essential to resolving this problem. The group identified potential sources of information as they relate to design elements. The group spoke with two representatives from both the ecological side as well as the architectural side of the design process. Dr. Chris Hess who has worked on the avian strike project at Butler University was helpful source in the start up of the research process. He provided the group with essential material on both a proposed research paper "Avian Building Strike Incidence Differs with Migratory-Residential Status Across an Urban Landscape" as well as a published research paper on different window treatment techniques titled " Avoiding Bird Collisions With Glass Surfaces" by Martin Rossler and associates. These primary articles allowed the group to further research into the different opportunities LOI can use to promote building techniques with area designers. Further on, the group interviewed Stewart Whitcomb, a private consultant that works with LEED certified building design. He provided beneficial insight into collaborative efforts with other designers as well as techniques that would benefit both in energy efficiency as well as the ecological perspective. These resources will ultimately be a useful tool for LOI's initiatives in working with new building designs in the Indianapolis area. Further research and collaboration was done to understand specific elements for building techniques. These included LEED certification and point system, Windows and treatments, both day and night lighting fixtures, and the overall landscape of the building.

A fundamental tool to investigate is the LEED, Leadership in Energy and Environmental Design, rating system. Many municipalities are requiring new construction to be a minimum LEED certified building. This is also a new requirement of all new constructed buildings at Butler University.

LEED certification is an important entity when thinking about green building design. Many buildings look for standards provided by the LEED rating system. The building group assessed the different point qualifications for buildings in terms of not only sustainability but limits to window fixtures as well as the overall building design.
Dr. Christopher Hess, a biology professor at Butler University presented different forms of window designs that can influence the distraction of birds away from windows. Already conducting research on avian window strikes

IV. Design

on campus, he gave the group beneficial suggestions on proper window decals including recent problems with the system set up on campus. This includes a minute amount of window decals in the shape of leaves that are set up on the skywalks on campus that are projected to divert the migrating birds. However, the amount of stickers and the distance apart is not sufficient to keep the birds from colliding. Dr. Hess provided the group with a research project conducted which tested for the most efficient window panels. Martin Rossler and colleagues tested different window treatments that in order to understand if birds are able to detect these and pass through the window spaces. Their results showed that different aspects in lighting as well and window features were more effective than others. They also noted that UV-light can be regarded as having an interrelation with UV- sensitive mechanisms in birds (Rossler et. al.) This allowed the group to understand how birds see different contrasts in materials. The project suggested using "invisible markings" for glass panes on the basis of UV reflections since birds detect UV light (Rossler et. al). They were able to suggest this because spider webs are a clear marker for birds, which use a mechanism of UV- reflecting substances. Lastly, they suggested that the best form of window treatment to be used on windows included acrylic horizontal pattern that was most effective in its function. The group suggests that LOI uses the paper by Rossler and colleagues as well as the paper by Hess and colleagues to create a basis of understanding different elements to use in Window design.

Lastly, the group wanted to further develop an understanding of different lighting that can be used in building design as well as the effects of colors, safety lights, flood lights, and residual lighting. As part of the design strategy for building materials the group wanted to assess the differences in modern architecture vs. old architecture to understand the trends and history of urban and city living. Both lighting and window treatments will have a quantitative effect on how much money is saved for window treating; however history is important to have a basic background of the modern techniques today.

Analysis: *LEED*

In order to make sure our LEED analysis and recommendations were accurate and feasible within a realistic architectural context, the group consulted the expertise of Steve Whitcomb, an architect of the United States Green Building Council (USGBC). An interview was conducted to better understand design techniques from an architectural standpoint. Stewart provided very insightful information that was useful in the basis of understanding LEED more clearly which will help LOI when working with Indianapolis area architects and designers.

The Leadership in Energy and Environmental Design (LEED) program is a very useful tool that could be used to improve awareness and LOI viability. LEED is a tool that helps create more sustainable building projects by providing a framework for rating building design, construction, and evaluation. The LEED investigates six categories as their main aspects of measurement: Sustainable Sites, Water Efficiency, Energy and Atmosphere, Materials and Resources, Indoor Environmental Quality, and Innovation and Design.

Sustainable Sites measures the location of the project. The most sustainable sites are locations that reduce transportation demand, restore degraded regions, minimize light pollution and manage stormwater properly. Water Efficiency measures effectiveness in lowering potable water usage of building while still meeting the needs of system and its occupants. The Energy and Atmosphere efforts hope to address energy through green building by focusing on energy demand, energy efficiency, renewable energy, and ongoing energy performance. Their requirements for this area include proper insulation, energy consumption monitoring, and using renewable energies.

Materials and Resources consideration focuses on the health and productivity consequences of material selections for building occupants, plus long-term social, economic, and environmental impacts of materials used in the design and construction of the building. Indoor Environmental Quality focuses on indoor landscaping, indoor air quality, and lighting. Innovation and Design credits are given to buildings with exceptional performance strategies that surpass existing LEED credits.

Apart from all of these, there is a Regional Priority Credits that are unique to each city. RPCs are not new LEED credits, but instead are existing credits that USGBC chapters and regional councils have designated as being particularly important for their areas. If an RPC is earned, then a bonus point is awarded to the project's total points. Each specific area, referenced by ZIP code, has six RPCs per rating system. A project may earn up to four bonus points as a result of earning RPCs, with one bonus point earned per RPC.

Within each of these categories that are specific requirements that a building

IV. Design

must meet in order to get a point. The points are summed and the total number of points achieved determines your status.

- Certified: 40-49 points
- Silver: 50-59 points
- Gold: 60-79 points
- Platinum: 80+ points

Within the framework of LEED there is no consideration about bird collisions on buildings. LOI could use USGBC to approve a Regional Priority Credit for Indianapolis Avian Building Design with hopes of lowering bird collisions. To do this, it would incorporate using Materials and Resources that are friendly to bird collisions such as low percentage of glazing, non-reflective windows, and safe window angles. Indoor Environmental Quality credits could be recommended that use safe indoor landscaping as to not attract birds as well as motion-sensored light switches (EA 1: Controllability of Systems: Lighting).

Furthermore, a point could be coordinated with the Sustainable Sites section encouraging building construction that does not contribute to, or establish an area to light pollution (SS 8.0 Light Pollution Reduction); Or additionally, a site that does not have a body of water, forest, or other vegetation surrounding it (SS 5.2 Site Development Maximize Open Space). Lastly, credits could be incorporated from the Energy and Atmosphere section. Points from here would encourage turning off lights during migratory seasons and implementing bird-safe strategies for outside lighting (EA 1: Optimize Energy Performance). By summing these into one RPC, a bonus LEED point could be awarded for buildings using Bird-Friendly practices. This could be a step for LOI to take in order to gain credibility and increase awareness with designers and architects in the Indianapolis area.

Glazing and Exterior Landscaping

Exterior landscaping has been identified as a contributing factor to daytime bird collisions. In a study conducted over 10 years in New York City demonstrated that majority of bird collisions occurred during daytime hours at lower levels of the building (New York City Audubon). This is because the presence of vegetation surrounding a building amplifies the effects of window reflectivity. Trees and other brush reflected in windows appear as though a habitat is actually there and is not just a mirror image (Image 1).

Image 1*: Tree reflected in windows demonstrates the effect of exterior landscaping and glazing.*

In order to minimize the effects of vegetation reflectivity it is important to address several factors. It is encouraged that windows not be placed in levels below the level of the surrounding tree canopy. However this is not always a possibility. Other, more viable, options include being actively aware of reflection when creating a habitat in relation to building features. It is important to place vegetation to minimize these effects.

Additionally, situating trees and shrubs immediately adjacent to the exterior glass walls (< 3 feet) or very far away (> 50 feet) will minimize the effects of reflection. Close proximity lowers habitat reflection, and when a bird leaving from this vegetation collides with the window it will not hurt the bird because it did not reach a high flight momentum. Lastly, if large bodies of water, areas of high tree density, or habitats are unavoidably reflective then it is encouraged to use fritted windows in order to increase the glass more visible to birds. All these help minimize the reflectivity of habitat in the glass, thus minimize bird collisions.

The University of North Carolina created a ranking system for buildings based on amount of glazing as well as other design attributes that contributed

IV. Design

to the overall ecological benefit of the building. A case study in Appendix A includes the basic regulations found at UNC during the case study as well as prime examples of campus building associated with avian collisions.

Lighting Design

Light pollution isthe result of allows artificial light shining outward and upward into the sky, where it's not wanted, instead of focusing it downward, where it is. Reducing exterior building and site lighting has been proven effective at reducing nighttime migratory bird collisions and mortality. However, for safety purposes it is sometimes impossible to turn off all of the building's lights. By implementing specialized lighting design techniques can reduce light pollution and bird collisions in these areas where lights cannot be turned off. These guidelines encourage efficient design of lighting systems as well as operational strategies to reduce light pollution from buildings, particularly during migration seasons.

Light pollution is largely the result of poor lighting design. It is classified as artificial light that shines outward and upward where it is not wanted. It is what disrupts birds migratory senses and leads to the bird collisions throughout the migratory periods. There are innovative ways to lower light pollution.

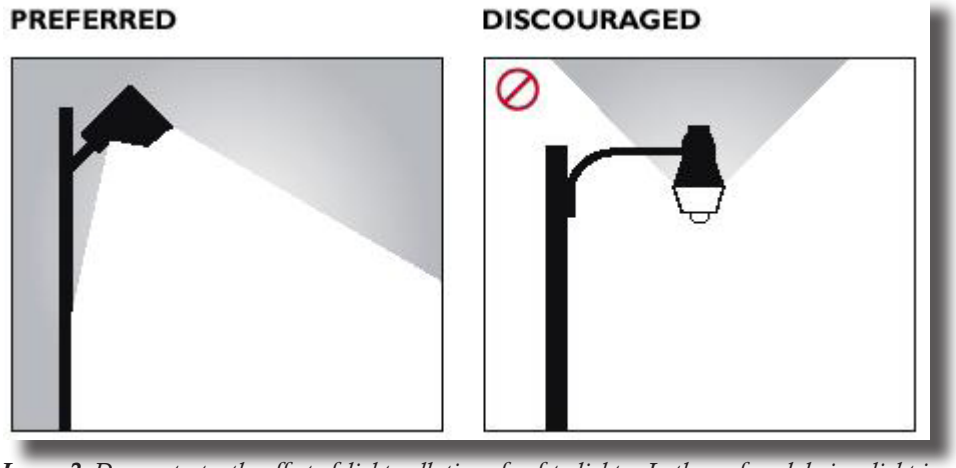


***Image 2**: Demonstrates the effect of light pollution of safety lights. In the preferred design, light is directed down where intended rather and lowers spill lighting upward where it is disruptive. (From mn.audubon.org)*

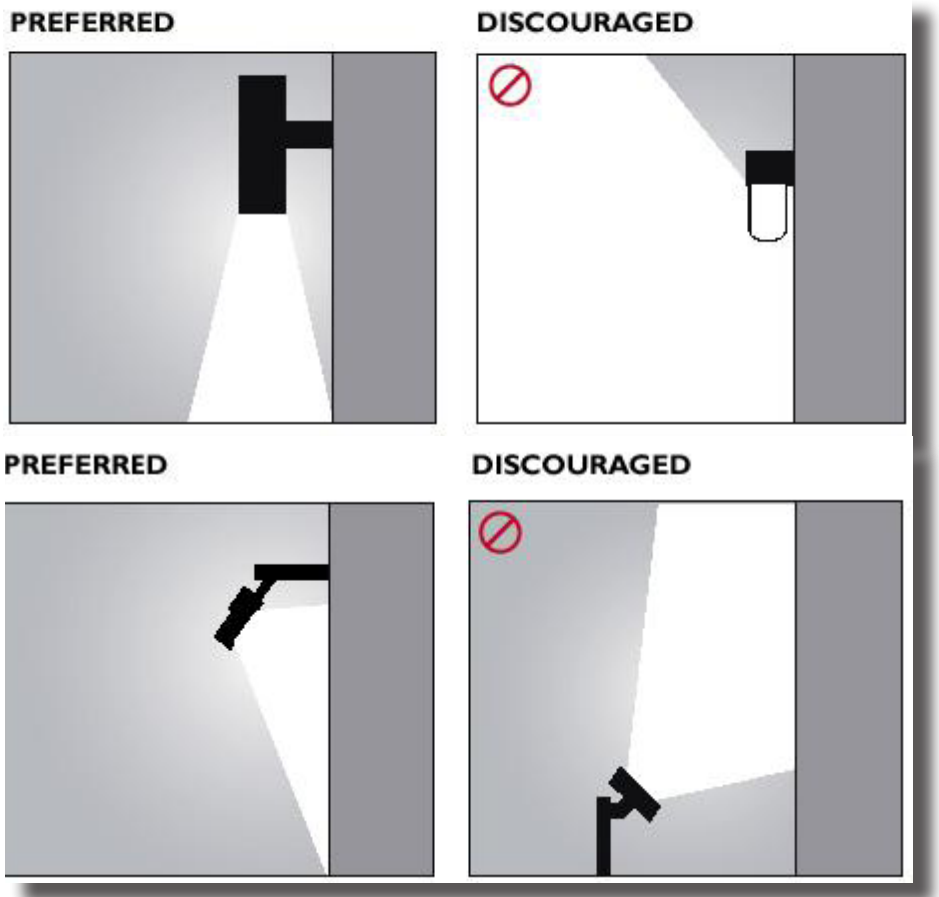


***Image 3**: Demonstrates the effect of light pollution of spotlighting and preferred wall sconces. Using Wall scones to highlight buildings greatly lowers the amount of light pollution of the building. (From mn.audubon.org)*

One way is to abolish safety lights that direct light upwards by attaching cut-off shields or lids (Image 2). This will limit the amount of spill light, or light that goes where it is not intended.

Another problem regarding light pollution is that lighting a building is aesthetically appealing. Thus, many buildings highlight their building using spotlights. These lights contribute greatly to light pollution. However, using sconce lighting that directs light downward buildings are still able to highlight features of their architecture while reducing light pollution (Image 3). This maximizes useful light by directing it to targeted areas, thus reducing costs

and bird collisions.

In order to lower light pollution emission from within the building, making simple design and operational changes is all that is required. Perhaps the easiest is to design lights with automatic controls, such as motion sensors, to turn lights on and off. This lowers the amount of overhead within the building that can flood the skies during night hours. Additionally, encouraging use of localized task lighting or window shades during evening hours can help lower need for overhead lights. Similarly, encouraging janitor services during day hours or to clean from top down in taller buildings lowers the energy usage.

By implementing these design techniques it will lower the overall light pollution that fills the sky. In doing so it will not attract birds to the high risk areas of collisions, thus lowering the number of collisions. Additionally, encouraging these operational changes will lower the energy costs of the building.

Summary

Based on the inventory and analysis conducted, and the case studies prepared by the class a rating system was devised (Table 2). This system is based upon different components including landscape, lighting, windows, and building structure. Buildings are ranked on a scale of 1-4, with 1 being the best. Each component is assigned a number, and then an average is taken. LOI can determine if each component should be valued equally, or heavier weight should be placed on certain components. For example, windows and lighting may wweigh heavier than the structure or height because bird deaths may occur more frequently below a certain height. LOI may want to further streamline it or alter it for migratory and non-migratory seasons. This system can help LOI identify existing 'bird friendly' buildings and potentially will be an influence in design decisions or provide incentives to designers when working with new building design techniques. It may also aid in determining priority buildings to pursue for participation.

Aside from the University of North Carolina, the group identified Minnesota Audubon Society as another great example for LOI to use to increase their overall image to the community. An online template of Minnesota's avian friendly guidelines will be a progressive measure for LOI to consider.

Also, suggestions in which buildings can add points for "bird-friendly" lighting, windows, and landscape have been outlined. After analyzing the "bird-friendly" building materials and other LEED certification requirements, the group came up with a potential proposal for LEED points to be rewarded for implementing these designs into their building construction or renovation under the Regional Priority Credit system.

IV. Design

Table 2: Design Group Draft Ranking System for Buildings

RANK	WINDOWS	STRUCTURE	LOCATION/ LANDSCAPE	LIGHTING
4	•< 20% Glass Covered •"Visible Noise" throughout building windows •Most windows are fritted or have shade devices •Window angles at 40 degrees	•Building < 50 feet •Green Roof technology	•Trees <3 feet from glass and/or Interior Landscaping is >30 feet from window •Natural Landscape is available but not adjacent to reflective windows	•Lights turned off at night •External Lighting is directed downward •Wall sconces used
3	• >35% Glass Coverage •Visible noise on most of windows •60% windows fritted or shade devices •window angle at 30 degrees	•Buildings between 51-300 feet	•Some interior landscape can be seen •natural landscape available that is limited to reflective windows	•Lights turned off during migration •Uses spill lighting • Some wall sconces
2	•>50% glass coverage •Visible noise not apparent •20% of windows contain fritting or shade devices •Window angled at 20 degrees	•Building between 301-800 feet	•A majority of interior landscaping can be seen •Vegetation that attracts birds adjacent to reflective windows	•Lights out during night and dawn hours •Some direct upward lighting
1	•>80% glass coverage •High-rise glass adjacent to key habitat areas •Glass vestibules are close to habitat •No visible noise present on windows or treatments •No windows contain fritting or shade devices •No angled windows present	•Building taller than 800 feet •No roof landscaping present •Contains large atrium	•Close proximity to feeding and habitat areas •No interior landscaping is hidden from outside •Large vegetation located adjacent to a majority of reflective elements	•Illuminated atria at night •Outside lighting has direct upward light

V. Management

The focus of this group is building management---specifically, the role that building management in Indianapolis plays with respect to the LOI initiative. The group's plan sought to identify the problems and to suggest possible solutions in order to improve the effectiveness and efficiency of LOI's work.

Building collision is a significant risk for birds that migrate through urban areas. The risk of building strike occurrence is dramatically increased when buildings are internally lit during the night (Erickson, et al 2005). The primary problems that the building management group faces are directly related to the challenges that LOI has encountered since it began in 2008. These are: (1) the death of migratory birds due to window striking and (2) energy used unnecessarily during nighttime hours. This is summarized in LOI's proposed slogan: Kill the Lights – Save Birds – Save Energy – Save Money (http://lightsoutindy.org/). The building management group's focus was increasing participation in the LOI initiative by finding effective methods of addressing building owners and managers. The issues more specific to the building group were considering the communication of the main problems to the associated stakeholders and attraction of interest and support from these stakeholders. Concerns for the group were whether an effective amount of interest could be garnered to produce a significant impact in support of LOI's efforts and how to collect relevant data regarding bird deaths while being able to transmit this information it in a meaningful way that is conducive with LOI's mission.

The building group's task was, first, to determine the most sensible targets for the study---who is LOI trying to reach with its message? To that end, the building management group created a simple "priority scoring system" to help narrow down and specify which buildings to target. The group decided—as LOI had already---that the Chase Tower on Monument Circle should be a primary target due to its prominent position in downtown Indianapolis, and due to its great height, which likely increases its contribution to bird deaths. After determining this target and applying the scoring system, the group developed an effective strategy pertaining to addressing the important stakeholders for this, or any, building. The plan, detailed later, highlights several areas on which LOI should focus to more efficiently market itself to potential participants.

Another way in which our group approached this issue was by designing an attractive incentive that should increase participation in LOI. Media recognition of the participation of a company or building in LOI should definitely help with gaining more participants. Additionally, the building group conducted interviews with a current LOI participant, an IPL representative, the manager of a prominent downtown building, and the founder of the Fatal Light Awareness Program (FLAP), based in Toronto. These interviews, notes from which may be viewed in Appendix C, offer valuable insight into the considerations that should be made by LOI as it moves forward. Overall, the building group sought to gain a better understanding of the complexities of the issue of potentially participating in LOI, to design a simple system to help with prioritizing targets, and to aid LOI in its development of an effective approach strategy for these targets. A hypothetical message to a target company may be view below.

Message to Targets:

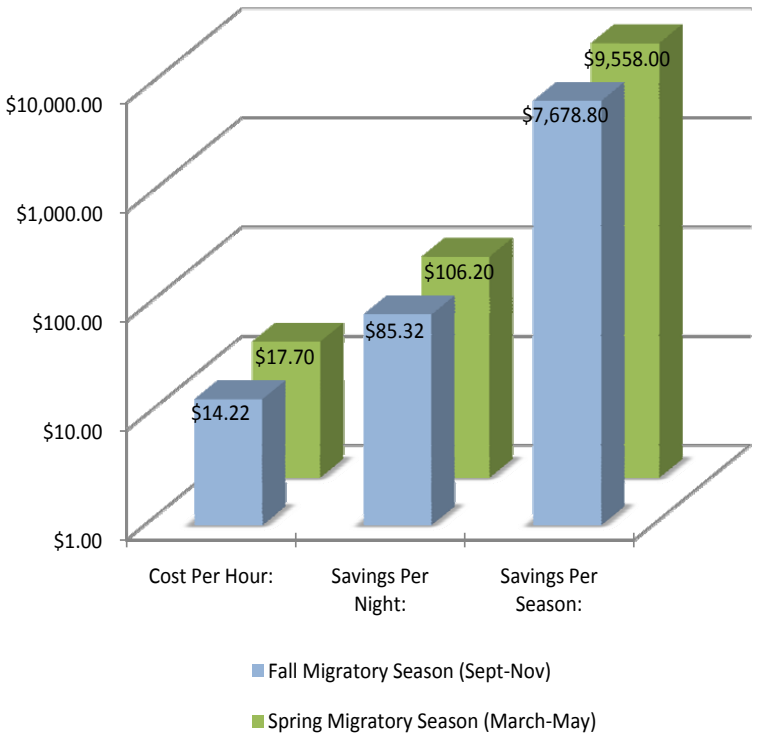
The death of birds due to window strikes is an environmental problem that is greatly affected by the actions of humans. In a 1990 study, Dr. Daniel Klem estimated that between 1-10 birds per building in the U.S. are killed as a result of window collisions; when this figure extrapolated to the entire country, the final estimate lies somewhere between 97.6-975.6 million bird deaths due to window collisions every year. As a building manager, you have the choice to be a part of the problem, or part of the solution. The simple measure of turning off your lights at night during migratory seasons will not only save on energy costs, but also save the lives of countless birds. Several prominent Indianapolis establishments have already jumped on board with this initiative, including the Indianapolis-Marion County Public Library, the NCAA Headquarters and hall of Champions, and the Indianapolis Museum of Art.

In a society that has become increasingly concerned with conservation efforts, businesses that show initiative in this area stand to gain a great deal. To that end, as a participant in LOI, your business will be recognized in NUVO magazine. As LOI grows in popularity and prestige, your company may experience a similar boost in reputation.

There is much more to be gained from participation than positive press. Participating in LOI will save your company money on power costs. Based on estimates from Indianapolis Power and Light, the following model was constructed as a guide to how much your company stands to save...see Graph 1

V. Management

Graph 1: Cost Analysis for 150,000 SF Building



Inventory

The management group made contact with several well-placed people in Indianapolis and beyond (Table 3). Each was able to contribute greatly to the project, either in offering insight or providing other services.

Implementation

The building management group developed a plan for LOI to follow in its pursuit of more participants. This plan suggests criteria that may be used in prioritizing targets; it then goes on to present a hypothetical "plan of approach" for addressing these targets. The building management group chose the Chase Tower (*111 Monument Circle, Indianapolis, IN 46204*), specifically, the skyscraper as the subject of a "mini case study" to illustrate the implementation of this plan.

Given its limited staff, it is crucial for LOI to maintain a high amount of specificity when determining the targets on which its workers' efforts will be focused. In order for LOI to prioritize targets in an organized fashion, a scor-

Table 3: Building Management Group Contacts:

CONTACT	RELEVANCE
Don Gorney; Amos W. Butler Audubon Society, President; Lights Out Indy, Program Director	Mr. Gorney introduced the class to the LOI initiative and offered his expert guidance throughout the project.
Michael Mesure; Director, Fatal Light Awareness Program (FLAP)	FLAP, founded in 1993, is a well-established bird conservation initiative based in Toronto. Mr. Mesure was interviewed and offered insight and advice for LOI.*
Mark Zelonis; The Ruth Lilly Deputy Director of Environmental & Historic Preservation, Indianapolis Museum of Art (IMA)	The IMA is a current participant in LOI. Mr. Zelonis was interviewed about LOI and offered great insight.*
Glenn Livers; Representative of Indianapolis Power and Light, Green Power	Ms. Livers assisted in providing power usage figures in the building group's calculation of potential money saved.
Sarah Myer; NUVO Magazine - Promotions and Marketing Manager	NUVO magazine has generously offered to provide free space in their publication for recognizing LOI participants.
Jeff Reynolds – Manager, Chase Tower, Indianapolis	Mr. Reynolds offered information for the Chase Tower case study as well as offering some general feedback on LOI.*

**Highlights from this interview are on page 16, and interview notes in Appendix C.*

V. Management

ing system was developed. The Chase Tower, specifically, the skyscraper, was used as a model for the application of this system. The building management group was able to conduct an interview with the manager of both Chase buildings, Mr. Jeff Reynolds.

The system is predicated on four criteria deemed by the building management group, influenced by Reynolds' insight, to be the most key in prioritizing LOI targets: building height, number of tenants, current lighting policy, and overall prominence. Building height can clearly be tied to the threat a building poses to migratory birds. A taller building would warrant a higher score, hence becoming a higher priority. The number of tenants in a building will be invariably tied to the feasibility of gaining the participation of that building. When interviewed, Reynolds stressed that, while the Chase Tower is not, by policy, lit at night, the individual tenants of the building may keep lights on at night for their own reasons. It would be easier to gain the participation with fewer tenants. Reynolds estimated that an "average" building downtown may house around thirty or forty tenants.

From skyscrapercity.com/cwilson758

The buildings that LOI will likely begin pursuing are the taller buildings, which will have more tenants in general. The current lighting policy of a building must also be considered; buildings whose lights are, by policy, kept on at night would be less likely to sign on with LOI. On the other hand, a building that does not normally keep lights on at night, but is not an official LOI participant, would be more likely to join. It should be noted that the building management group still heavily encourages LOI to pursue buildings that are currently lit at night; this specific criterion is designed to provide an initial boost in participation off of which LOI may build in the future.
Lastly, the prominence of a building is a key facet its attractiveness as a potential participant. The participation of a notable downtown building, Chase Tower, for instance holds the "trendsetter" potential. Gaining the participation of the Chase Tower, a building in which LOI has already expressed interest, would undoubtedly make the prospect of participation more attractive for other targets.

Each category is based on a point ranking of one to ten, with the exception of the lighting policy, which is more of an "either/or" category. A score of zero to 20 designates a building as "low priority"; a score of 21 to 30 translates to a "medium priority" building; a score of 31 to 40 places a building in the "high priority" category. Again, this system is designed to boost participation in the immediate future. LOI is encouraged to modify these categories or point designations to fit the needs and mission of the program appropriately and as they change over time.

This ranking system was applied to Chase Tower (Table 4). The total score of 33 out of 40 places the Chase Tower, not surprisingly, as a "high priority"

Table 4: Proposed Building Management Ranking System Applied to Chase Tower

CATEGORY	DESCRIPTION	SCORE
Height	Building A - 247.0 m (815.1 ft) (Skyscraper Source Media, 2010)	10
Number of Tenants	Approx. 70	3
Night Light Policy	Building Policy - No light at night	10
Prominence	Tallest building in Indiana, center of downtown. Iconinc in skyline.	10
	TOTAL SCORE	33

V. Management

building. We recommend that LOI use a this formula, or one similar, when deciding which buildings to pursue.

Interviews

The interviews conducted by the building group were meant to shed light on various sides of the issues LOI faces. Each interviewee offered personal feedback on the issue of bird strikes and the LOI initiative. The following section contains highlights, those parts which the group deemed most useful for LOI, from these interviews. We advise that LOI interview its other, current participants and to cite their feedback when approaching potential participants.

Michael Mesure, FLAP	
Advice for LOI	• Create excitement! Try holding an event with some sort of celebrity present to generate excitement for the LOI initiative. • Remember that the tenants, in general, are in control of whether certain areas of a building are lit at night. • Do not neglect the problem of daytime avian window strikes. This is another huge problem that has solutions in sight, such as window treatments. • Be sure to educate building managers and city representatives on this problem.

Mark Zelonis, The Ruth Lilly Deputy Director of Environmental & Historic Preservation (IMA), current LOI participant	
Advice for LOI	• Appeal directly to building managers. • Media outreach would help greatly.
Insight for Potential Participants	• If the IMA and downtown library can participate, what about skyscrapers which contain so much more glass? The positive impact of a skyscraper's participation would be very great.

Jeff Reynolds, Manager, Chase Tower, Indianapolis	
Advice for LOI	• Marketing your building is very important, and you want it to be seen. For instance, during a nationally televised sporting event, leaving lights on in a building allows it to be seen on the skyline • There has not been an exorbitant amount of strikes on the building. Cleaners have reported finding a few birds, but not many.

Conclusion

LOI and its volunteers are encouraged to pursue these recommendations and to judge their effectiveness to determine if they are sustainable, productive options. Hopefully the proposed message to targets, the incentive package, the priority scoring system, and the interviews conducted will help to advance the mission of LOI and its volunteers as they continue their mission to make Indianapolis a more bird-friendly city and reduce energy consumption.

VI. Outreach

Background

LOI highlights the important issue of window strikes with buildings in downtown Indianapolis. Birds rely on stars to navigate migration routes at night. It is believed that lighting from large buildings disrupts this navigation and results in birds striking sky scrapers. Given this overall issue and the mission of LOI, the problem from a public standpoint from a non-profit that relies on volunteer and community support as its main resource is that the general public, building owners, and building designers are under-educated about the effects that building lighting has on migratory birds. Other groups within LOI will be looking into the building management and their views upon reduced lighting. With their investigation, they should find why buildings are not more involved in the program. This should help gain more support from buildings that have not implemented LOI. Also, the architects of Indianapolis will be contacted for more information about LOI and how it could be associated from the ground up, literally. If the building was built for a bird friendly passing way then we would not have the problem to begin with. Understanding a more adequate way of constructing buildings not only would help immediately but also the future of migrating birds. The outreach group intends to invade the community of Indianapolis and spread awareness of LOI to the public. The outreach group will be promoting education about LOI to the public, the building managers, and the architects of Indianapolis, in hopes of gaining support. Since LOI is a relatively new organization, this group should spread the word. The outreach group's intention is to educate and bring awareness of the organization. This will be accomplished through surveys, pamphlets, and videos in an attempt to gain the support of the community, and increase involvement and volunteer opportunities.

Focus

Since LOI began a few years ago, it has had limited support from buildings and building managers. The problem for this group is not birds or bird strikes, but education and visibility of the LOI initiative. The purpose of this group is to educate the Indianapolis community about LOI and bird strikes or increase awareness of LOI to the Indianapolis public. This group will assist LOI in developing outreach and education information (packages) for Indianapolis, also including building managers, and building designers. First, the outreach program will target individuals who spend time downtown, such as business owners, employees, runners, bikers, walkers, and travelers. Additionally, garnering community support will provide more incentive for buildings and building managers to participate in the program. With larger buildings joining the LOI program, more recognition will be accepted. If LOI becomes more accepted then the greater Indianapolis public will want to become involved in the program. Visibility remains a key aspect to the results of the public awareness. Along with the larger buildings, the everyday person going to work or on a run can be a huge asset to the research and data collection of Lights Out Indy becoming an active citizen. LOI is a relatively new program with little funding, so with the help of volunteers the program could become much larger. With the current lack of resources and people, it remains difficult to find every dead bird in Indianapolis. If people who are downtown on a regular basis report birds to LOI research and data collection will be easier and more accurate.

The second focus of the outreach group pertains to building managers. This will be, by far, the hardest to convince on the significance of LOI. However, since LOI is a relatively new initiative of AWBAS, some building owners might not be informed on the benefits of LOI. In this situation, rather than the general public, benefits of turning off lights will be mentioned. This will hopefully catch the building owners attention about the money saved.

The last group that the outreach team will focus on is building designers. Stopping the problem of lighting at the mainstream source design level, will prevent much of the future lighting problems occurring. An outreach package for building designers including architects and those involved in construction is necessary to raise awareness of the need for bird safe buildings. Outreach messages will include a brief introduction that describes the problem of window strikes, followed by a description of what LOI does to help. - Additionally, suggestions will be made about what can be done as a building designer to create a more bird safe building.

VI. Outreach

Inventory

When developing outreach package, there are many elements to consider. Through the research and information gathered in the class case studies, and interviews performed by other groups, a list of outreach items was generated. Table 5 outlines things to be considered when developing an outreach package for LOI. This list is not exhaustive, but represents items or information deemed significant by the group, and important tools for developing a thorough outreach package.

Table 5: Items Consider in Developing Outreach Package

ITEM	IMPORTANCE
Volunteers	Help gather Data
Building over 4 Floors	Potential partners that are major buildings
Mississippi Flyway	Route migratory birds use
"Dead Bird Route"	Walking route for citizens to find dead birds
Smart Phone Apps	Allows for citizens to help identify birds
Brochures	Distribute to citizens
Contacts/ Networking	Local businesses to spread the word
Demographics	Understanding the community/ target
"Dead Bird Field Guide"	Most common birds that die (used in Toronto)
iPad	Show presentation or surveys online
Participating Buildings	Gain momentum, endorse
Media Outlets	Allows for more communication and attention
Architects	Present/ educate public about building design
Audubon	Support, information, advocacy

Information is crucial, but the technology that is involved is a major part of the project as well. Smart phones are excellent for internet access on the go while volunteers are monitoring bird route paths. An HD Video Camera may be used to make a short advertisement for the public that will be put on the Internet. In order to add to outreach effectiveness, mechanisms such as surveys, interviews, and contact with media outlets, businesses, and communities is recommended.

As mentioned previously, Indianapolis is the 14th largest city (based on population) in the U.S. It is centrally located in Indiana, which lies in the middle of the Mississippi Flyway for migrating birds. The Mississippi Flyway runs from Louisiana to Canada. This wouldn't be an issue except, for the tall buildings typically found in the major cities the birds will pass through. The buildings present a physical obstacle, and are responsible for generating emitting light at night.

For the purposes of increasing outreach success, a list of potential stakeholders was identified. The stakeholders that were included were determined to be an individual, organization, or company that could be positively or negatively affected by LOI's goals (Table 6). The outreach packages, described later, will be shaped by these stakeholders.

Table 6: Identified Stakeholders

STAKEHOLDER	WHAT'S AT STAKE?
General Public	More knowledge on the topic
Building Owners	Public perception
Indianapolis Power and Lighting	Potential loss of major financial staple
Audubon	Publicity as a result of LOI
Building Maintenance	Limited number of workers

VI. Outreach

Implementation

This group suggests that LOI develop education and outreach materials to educate the greater Indianapolis community. The outreach program proposed is divided into 5 groups:

- **brochures/publications**- The brochures will be handed out to local businesses for them to display for the general public. Information on the brochure will include the purpose of LOI, the most common birds in LOI, the participating goals of LOI, the mission statement of LOI, and contact information to further knowledge of LOI.
- **on-line campaigns** – Will consist of volunteer opportunities, also marketing/advertising to gain support from larger buildings .
- **electronic petitions** – The iPad or smart phone app will have a petition in which the general population can fill out while in the streets. The Petition will consists of several questions about LOI and provide information on LOI. There will be a place for a signature at the end of the petition
- **mobile technology**- The focus of this group will be revolved around taking pictures and sending them to a designated location. For instance, if someone finds a dead bird on the ground, they will be able to send a picture for confirmation of the bird.

Brochure:

This brochure description and outline can be manipulated to fit the three target groups: general public, designers, and managers. Some suggestions for the focus of each target group are included.

First Panel: cover panel. It will draw attention using pictures that apply to the target group

General public: Bird deaths
Designers: Bird safe buildings
Managers: Saving money by putting lights out

Second Panel: introduction panel that describes the problem. It can include information about window strikes and how building lights are related to this.

Third panel: description of what LOI does to help. It will talk about what they have done, are currently working on, and what they plan to do in the future.

Fourth panel: suggestions for what each target group can do to help.

General public: volunteering
Designers: bird safe building practices
Managers: Turn off lights at night

Fifth panel: describe why this is important to each target group. They may not believe they are stakeholders in this, so it must convince them that they are involved. It can also include benefits and incentives.

General public: Become a closer knit community, turning lights out saves bird lives and energy, have cleaner more productive Indianapolis by becoming more bird friendly, make a difference
Designers: Bird safe buildings are important to make your construction more well respected
Managers: Turning off lights saves energy thus saving money, unnecessary lighting wastes money every day

Sixth panel:

This panel is the contact panel. It tells how to get involved in LOI by giving contact information such as phone numbers and websites.

Short film:

Social media, Youtube and other on-line outlets should be taken advantage of to further LOI's mission. A short film could be easily produced and shown via a mobile website, on iPads or other portable devices by volunteers, posted on Facebook, and provided to participating buildings for increased visibility. A potential "story board" is outlined below.

Music is playing and there is a sense that a great journey is about to happen. The camera is the eyes of a bird flying at night. A bright light attracts

VI. Outreach

the bird and it ends up crashing into a window, ending its journey early. Darkness flashes in and out of the birds eyes, giving the sense of losing consciousness. The audience then sees that the bright light is from a building that could have had its lights off that night. Zooming out of the bird's body, the film reaches a sad ending and information on LOI and how you can stop this from happening is brought to the screen.

This film will help with LOI's goal of educating the public at large through the media. It will be available on the Internet. LOI's news story that is currently on Youtube does not have that many views. By linking this video on the LOI site, Facebook, Twitter, and other associated websites, more people will be aware of it. Not only does this video apply to the general public, but it addresses the designers and managers as well. It is a way to raise awareness of LOI that does not take long to watch and people can view it on their own time.

Social Media:

A Twitter account has been established for LOI. In the absence of a mobile website or smart phone app Twitter will enable LOI to gather basic information readily from 'follower' who encounter a downed bird. It offers the ability for followers to upload photos and other information. Furthermore, LOI can highlight interesting information regarding other lights out programs, endorse sponsors and other community partners. It is suggested that LOI 'tweet' several times a week to increase visibility. Information regarding Twitter is included in the supplemental outreach sample packet prepared for LOI.

LOI has a Facebook page, but it is not updated regularly enough. LOI may consider seeking an intern who is interested in social media that can work to keep both of these tools updated. Facebook can be used to organize events and invite guests, or share maps and information. Figure 5 illustrates a sample "priority" route prepared for LOI. It highlights areas of importance for pedestrian surveys based on building locations and height. This type of map could be uploaded to Facebook or other social media outlets along with volunteer requests to recruit participants.

Synthesis

Lights Out Indy (LOI) has only had limited success from buildings and building managers thus far. Further, LOI is still fairly unknown throughout the Indianapolis area. The goals for the outreach group are to educate the public about LOI and bird strikes and prepare strategic plans for recruitment of specific target groups within the Indianapolis public.

The three target groups for LOI should be the general public, designers and managers. The general public group would start with people who inhabit and use downtown Indianapolis. Technically, this group encompasses the other two, but the designers and managers have separate strategies. Gaining public support is crucial for LOI. The public group can be used as an asset for research and programming for LOI.

The second target group is the building managers. While this group will be difficult to convince, LOI can partner with the Audubon. Beyond using other groups, LOI should emphasize the monetary advantages of conserving energy and turning off the lights. LOI should also provide decals for each participating building. The decals will serve as further promotion for LOI and a as an identifier of participating buildings.

The final target group is the building designers. The support of this group holds great dividends for LOI. The outreach package needs to educate the designers and architects on the bird strike issue and how they can design more effective, bird safe buildings. Depending on the LEED points, LOI could utilize the green advantage of bird-friendly buildings.

While each group needs specialized focus, there are several methods and materials that can be generally used. Publications, such as brochures, can hold general education as well as specialized information and are an easy method to convey information to people. LOI needs to adopt a year-round strategy instead of just migration times. On-line campaigns are very effective (and low cost) way to get information to a variety of groups. LOI could use them to both recruit volunteers through social media such as Facebook and Twitter. Through LinkedIn, LOI would also be able to connect directly with managers and designers. Electronic

VI. Outreach

petitions utilizing smart phones and iPads are a great method to gather public support but can also be used to convince the designers and managers of LOI's support base. It is necessary for the iPads to be 3G for wireless compatibility. This will allow LOI to take them to the street. As far as a time line for implementation, most of these methods could be started immediately and run simultaneously.

Being a relatively new organization, there is lots of room to grow from here. After completing the current proposed implementation strategies, LOI should pursue wider spread support throughout the Indianapolis metropolitan area. One method to accomplish this is to further the use of mobile technologies. Partnering with other conservation groups and consolidating mobile smart phone apps will lead to greater support for LOI.

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VIII. Appendices

VIII. Appendix A: Case Studies

Name of Organization: US Fish and Wildlife (in conjunction with South Carolina Department of Transportation)
Type of Organization: Government
Location: Charleston, SC
Year Established: 1940

Mission:
The U.S. Fish and Wildlife Service (USFWS), a Federal bureau is located within the Department of the Interior. The mission of the U.S. Fish and Wildlife Service is working with others to conserve, protect and enhance fish, wildlife, and plants and their habitats for the continuing benefit of the American people. Our ability to achieve our mission depends on active cooperation with others. Fish and Wildlife Service is committed to a collaborative approach to conservation. Our strategy is to empower Americans to become citizen conservationists. The more the Service can empower people as stewards of the land, the more effective we can be in our conservation mission.

Demographics:
Staff: Paid, governmental offices
Audience: State governments, public, corporations

Funding: Funding for the USFWS comes from the US government.

Projects:
• Gateway Bridge Project
• I-73 Project
• General Conservation

Incentives: Businesses and States have a large incentive to join with the USFWS. They have the power to severely slow or stop the progress of projects. Being a governmental office, this allows them the power to really help and conversely hurt projects.

Policy: Very involved in law making, passing several acts, including wild bird conservation act of 1992

Evolution: The USFWS has grown over time. It started as a part of the US Department of the Interior, however it has grown into it's own entity with the US Department of the Interior as a parent agency.

USFWS has always helped with conservation through the Department of the Interior. The success of this organization is generally based on how cooperative the state and local governments are. In South Carolina, both the USFWS and South Carolina Department of Transportation seem to work very closely and effectively to both protect the environment and get roads and bridges built.

Specifically for the Gateway Bridge, USFWS worked with the bridge designers to try to limit both bird deaths and to protect the loggerhead turtles nesting and breeding habitats. They worked on 2 main changes to bridge; the direction of lighting and amount of light. USFWS suggested using 250 watt bulbs instead of the traditionally used 1,000 watt bulbs. This helps to conserve energy, saves tax payers money and limits bird strikes. The lights for the bridge were also designed to limit ambient light on the bridge essentially directing light to the desired location and not the surrounding area. This helped with the turtles because it limited the light that went to the water, allowing them to maintain their usual breeding and nesting habits.

Beyond this bridge, USFWS is working with South Carolina Department of Transportation in the construction of a 44-mile stretch of I-73. This stretch of highway was seen as a potential hazard or danger to the surrounding wildlife. The road runs through multiple flood plains and other wetland areas and the disruption of them could have much broader environmental effects. In order to promote the protection of these watersheds, USFWS setup a unique compensation package based on how limited the loss of wetlands is. Basically, if the wetlands are conserved based on landscape scale, they will be partially compensated for the cost of the road.

Although this project and Lights Out Indy are different types of projects, Lights Out Indy could adopt the methodology used to help conserve and lessen bird deaths in South Carolina. There are several important aspects and techniques that Lights Out Indy could use in the future. Lights Out Indy could attempt to work with US Fish and Wildlife. If they had the support and help of the USFWSthey could increase the awareness and have more of a force when working with businesses and building managers. It will also allow Lights Out Indy to offer more to the companies that do support them. This example is also important because of the foresight in building. The bridge designers consulted and worked with USFWS in the beginning and not as an afterthought. This is another potentially useful tool for Lights Out Indy. If they could work with building designers in the future, bird deaths through window strikes could be limited. Even if it is as simple as using windows with UV reflective parts in them they could potentially eliminate bird strikes for that building. Overall, this example is good for the Lights Out Indy for and example strategy.

VIII. Appendix A: Case Studies

Name of Organization: University of North Carolina: Conservation Biology
Type of Organization: University
Location: Chapel Hill campus, North Carolina
Year Established: 2008

Mission: Dedicated to evaluating birds as indicator species, determining the species of birds that best fit this role, determining the effects of urban sprawl and habitat fragmentation, developing and evaluating construction strategies that will create "bird-safe" buildings, and evaluating the current campus architecture.

Demographics:

Staff: Unpaid students conducting class research consisting of 7 members in 2008
Audience:The public and the surrounding community of Chapel Hill campus in North Carolina

Funding: No financial funding was provided to the students however informational funding provided by the Chapel Hill Bird Club as well as contributions from the Botanical Gardens Visitor Educational Center

Projects: Reconciling Nature and Buildings

- •Defining Bird Safe Buildings as green, yellow, or red level
- •Assessing the campus's buildings

Incentives: To increase biodiversity of bird species, to maintain the natural health of the local environment, maintain levels of insects and rodents, continuance of vegetation by the distribution of seeds and pollination of flowers, and to maintain the recreational purposes of bird watching.

Acknowledgement: Initial idea stemmed from William McDonough, Betty King and Ned Budnitz from Chapel Hill Bird Club, and Haven Wiley from University of North Carolina

Policy: Although there were no defined contributions to policy or lobbying for the bird strike initiatives, William McDonough is a world-known architect who tries to create not only sustainable buildings worldwide, but also buildings that affect the overall environment in a positive manner. Promoting his work on the website helps to push towards understanding better buildings.

Media: www.birdsandbuildings.com

Evolution: No evolution of the site or progress of the initiative has been indicated neither on the website nor by any of the contributing members of the research.

Buildings and Birds was a conservative initiative conducted by several conservation biology students at the University of North Carolina-Chapel Hill in 2008. Their initial goal was to evaluate the term "green buildings" which lead them to think about building design in general. Upon investigating the term, they stumbled upon William McDonough, a world-renown architect and winner of three U.S. presidential awards whose efforts in building design include ecological, social, and economical planning. Their research revolved around McDonough statement "A building should be judged not just by its energy performance, but also by the number of birds that could be heard singing outside the building". Their overall approach in the project was to explore McDonough's assertions about building architecture and develop an assessment of "bird safe" buildings around the Chapel Hill campus. By dissecting McDonough's perspective on "green buildings", the students planned to evaluate birds as indicator species, determine the species of birds that best fit this role, determine the effects of urban sprawl and habitat fragmentation, develop and evaluate construction strategies that will create "bird-safe" buildings, and evaluate current campus architecture.

Using scientific-literature provided for the overall population of bird species within that area, a number of species were picked out amongst the group and tagged as "indicator species" of ecosystem health. They also evaluated and compile the history of the area around the campus as well as the site of the new botanical garden visitor center that is pending LEED platinum certification. They compiled a list of 6 species of birds that were seen around the area including: thrushes, tanagers, orioles, warblers, finches, and sparrows. They were also classified by year round residents, breeders present in spring and summer, as well as winter residents.

Secondly, the research looked at the building effects on special patterns of habitat and native birds. They state that much of the building process and policy making remains anthropocentric, centered around human needs rather than environmental. A factor that is part of the spatial effect of buildings includes the building-effect zone. A building effect zone is stated to be a function of human activity, noise, free-ranging pets, and changes in light levels and air composition compared to habitat prior to construction. Since the botanical garden visitor education center is being built, they wanted to take into account the overall possibilities that it will cause. Although some species may deter away from this area, others may benefit from it and therefore continue to live in the area. The group also took into account the nesting success of spe-

VIII. Appendix A: Case Studies

cies of birds that are associated with habitat fragmentation. Clearing landscape for a building is quite detrimental unless native vegetation is properly grown in the areas to continue to allow birds to thrive in the area. Spatial effects and fragmentation are two of the main problems that the group has been able to identify in the study.

The most important aspect of this subject was to clearly define why birds are important. Birds are an ecological contributor to the over-all sustainability of the health of a environmental system. Not only are they part of the food chain on many levels, but they are also maintain levels of other species that without them, many rodents and insects would populate out of control. They are also distributers of seeds and pollinators of plants that allow other vegetation to grow. This helps to keep damage away from wild plants as well as agricultural crops. Lastly, bird watching is one of the most common activities to do world-wide.

Next, the project helped define what a bird-safe building consisted of in terms of glass technique and lighting. Glass and windows are especially potent to bird killings because these species are unable to detect windows in their flight path due to the reflectivity as well as transparency of windows. The group provided solutions that would possibly alleviate the problem including:

- Create and maximize visual noise that alerts birds and triggers recognition such as sand blast on the outside surface
- Reduce overall percentage of glass
- Apply patterns and shapes over the glass panel or window
- Netting, screens, shading devices,
- Fritting, edging and opaque patterns,
- Minimize glazing or use low reflectivity glazing in predictable bird collision landscapes
- Use angled glass at 20 to 40 degrees.

Lighting is also an issue that the project was able to identify and provide some solutions. Lighting at night or in the interior of buildings can create confusion and disorientation of the internal navigation of nocturnal birds causes them to suffer from exhaustion or collide with the buildings. Solutions were also including in lighting techniques for both interior and exterior including:

- Light colored blinds or curtains
- Light timers
- Turn lights off at night
- Use least amount of exterior lighting possible
- Avoid floodlights
- Redirect upward light

These suggestions all seem reasonable and will also benefit in terms of energy consumption and savings.

Lastly, the project assessed the buildings around the Chapel Hill campus in North Carolina in terms of green level, yellow level, and red level.

•**Green level**- They have also been seen to be constructed around the 1940's. All of them have minimal glass coverage, solid and uniform structure, and windows with visual noise such as very small framing, blinds, shades, and screening.

•**Yellow level**- Many buildings were found to have both bird-safe and not bird-safe features. The main problem areas were large reflective windows and landscaping. Although retrofitting these structures to be more bird safe would still be highly beneficial, they are less urgent than those in the red zone.

•**Red Level**- performs poorly when tested against the bird-safe guidelines, and are labeled as high risk. Most modern buildings fall into the category after dating past 1968. The main reason for this is a shift in architectural trends towards increased use of large expanses of glass.

Their conclusions stemmed that it will be very hard to construct a parameter based off of bird-safe building construction. As long as birds can continue to live within the area, a building should be conscious of the efforts they put towards window placing and light control. Other such conclusions included keeping the highest level of corridor connectivity for birds to fly through, leaving as much vegetation as possible to combat parasitism and predation resulting from edge effects. As well as leave more noticeable structures next to windows so that birds may identify and restrict from flying near the area. In light of their research for the
construction of the new botanical garden visitor center, the class was able to conclude that the center will be save for the preservation of bird diversity on the campus.

The project conducted by the University of North Carolina conservation biology class shows that there are many different problems associated with buildings in relation to how they affect the bird population. Not only do buildings contribute to habitat fragmentation but also in terms of bird killings due to window exposure. It just shows that not only does this occur on college campuses with shorter buildings and less window access but the problem can lie within cities that light tall buildings at night and have a larger window exposure. This is exactly what Indianapolis faces and this should serve as a tool to help devise a system in which buildings can become more bird friendly. One of the key points that the research included was using a larger world-known architect that is respected within the architectural world. If Lights Out Indy can pair up with someone well-respected and known, more stakeholders will

VIII. Appendix A: Case Studies

want to put effort towards the initiative that we have. However, the project did not necessarily appeal to the public audience in terms of incentives that arise from becoming friendlier to the avian community. Having positive incentives for those interested would be more appealing to the whole and would help promote sustainable practices amongst environmental factors. It was an good and important study that was conducted in order to become more aware of the problem at hand.

Name of Organization: Lights Out San Francisco
Type of Organization: Public
Location: San Francisco, California
Year Established: 2007

Mission: Lights Out San Francisco is a community-based organization with the goal to save energy by encouraging people to turn off non-essential lights and appliances.

Demographics:

Staff: Steering committee consists of environmentalists, technologists, writers, and educators from the Bay Areas. Had at least 2 full time staff members, had some other part time staff and various volunteers
Audience: Public, local buildings/businesses, political

Funding: Private donations from individuals and corporate sponsors. Supporters included Esurance, Google, Gap Inc., Integrated Archive Systems, PG&E, Safeway, Tides Center, and Yahoo!.A fundraiser was put on at a local bar as well, where the public could come ask questions to director.

Projects:

• October 20th 2007 8-9pm "Lights Out San Francisco" Local buildings turned non-essential lights off and installed one energy efficient light bulb in an effort to raise awareness about energy conservation and to reduce carbon emissions into the air. Public invited to join LOSF in Dolores Park to watch the city go dark.

Incentives:

Acknowledgement: supporters were listed on their website, including pictures of the larger buildings before and after with their lights on and off
"Save energy, save money"

Policy: None other than support for lights out policy and Earth Hour

Media: Press conference at City Hall televised, founder Nate Tyler interviewed on NPR, internet advertisements, newspaper mentions

Evolution:Lights Out San Francisco began as a local movement in the Bay Area. It grew to include Los Angeles and surrounding areas when the actual Lights Out San Francisco event occurred. After this, it evolved into Lights Out America, which was one of their goals to accomplish after doing the Lights Out San Francisco event. This basically turned into America's support for Earth Hour. They haven't called for an official event since 2008 because Lights Out America coincides with Earth Hour.

Strategic Plan: For the future, they wished to team up with additional cities and similar organizations. They also wished to implement a phase 2, which would include focusing on downtown San Francisco's commercial buildings since they had already reached out to the community.

A grassroots movement, Lights Out San Francisco was founded by Nate Tyler who heard about a similar initiative in Sydney, Australia (Earth Hour). The idea was that turning out the lights in the city would conserve energy. Nate Tyler acted as Founder and Executive Director rather quickly. Within one week he had contacted the Mayor's office, SF Dept. of Environment, PG&E (the main electric utility provider in California), and possible sponsorship companies. A couple months later he had a full time staff member and had a steering committee, office, sponsors (Restaurant Association, PG&E, Safeway) and endorsements, as well as features in the news. PG&E provided Compact Flourescent Light bulbs for them to distribute freely. Safeway distributed flyers in their stores. They met with Flex Your Power to discuss how to promote their organization. There was a listing put on Volunteermatch to get more help with CFL distribution and spreading information. They were endorsed for a week by the Department of Environment and featured in the Examiner. This was all in an effort to establish an hour for turning the lights off in the city, and an event was made of it by inviting the public to share the hour in a local park with music and candlelight dinners at participating restaurants. There was a lot of publicity leading up to the event, with TV features, press conferences, and advertising with flyers, t-shirts, posters, and brochures in storefronts. Since the information was spread to a wide audience, the event was a great success, with volunteers in the park and the buildings participating including Golden Gate Bridge, SF City Hall, Coit Tower, TransAmerica building, Alcatraz Island, local city, county, and business buildings, and the restaurants promoting candlelight dinners. The concert they had in the park and Opera In The Dark also attracted the public. One energy efficient light bulb was installed in participating

buildings to raise energy conservation awareness.
The entire organization boiled down to this one event. After it occurred, any further expansion was put toward Lights Out America and partnering with Earth Hour.

Summary:
The most important thing to learn from Lights Out San Francisco is publicity is key to getting widespread support. They began with a blog and turned it into a city-wide undertaking. Instead of asking buildings to participate at their own discretion, they invited buildings to take part in a city-wide event. This helped them get numerous community supporters, as well as backing from stakeholders with similar interests such as the International Dark Sky Association whose mission is to "preserve and protect the nighttime environment and our heritage of dark skies through quality outdoor lighting". Since they had so much publicity, nearby cities such as Los Angeles also participated. After the Lights Out San Francisco event, they received a lot of inquiries from people asking how they can get involved. This is why they were able to progress into Lights Out America. The World Wildlife Fund is now in charge of coordinating events, since Lights Out America coincides with Earth Hour.

I think that since this began as a small community-based organization, similar to Lights Out Indy, there are parallels that we can look at. Getting local people interested and talking about the organization triggered curiosity from the local buildings and businesses that the community frequented. While they started small, they moved quickly and I think that Lights Out Indy is capable of the same growth.

Name of Organization: New York City Audubon (Lights Out New York)
Type of Organization: Government/volunteer
Location: New York City
Year Established: August 2005

Mission: New York Audubon is a grassroots community that works for the protection of wild birds and habitat in five boroughs, improving the quality of life for all New Yorkers.

Demographics:
Staff: Mix of Paid staff & over 10,000 volunteers (non-paid)
Audience: New Yorkers and building owners.

Funding: Private, donation
Projects:
- Lights Out New York
- Project Safe Flight
- Harbor Herons
- Look Around NYC

Incentives: Buildings who participate in this program are recognized by the Audubon Ceremony and posted on their website. Also, the buildings who comprehend receive media and press releases on their involvement. As an added bonus, the buildings energy cost are reduced.

Policy: Voluntary; but over the past 3 years they have been making progress on forming it into a policy.

Media: Lights Out New York is advertised in the major newspapers of New York. In the articles, they praise the buildings for cooperating with New York Audubon. While giving recognition, they also give locations of volunteer opportunities (such as the Christmas Bird Pick Up and walking daily routes.)

Evolution: The mission has continued to remain on bettering the community of New Yorkers and help birds from being injured or killed. However, the organization has grown contagiously and more buildings are adopting the strategy of turning off their lights.

The New York City Audubon is an organization dedicated to bettering the surrounding community and the well being of birds. This organization provides information and education about nature and the community which contains it. While trying to save birds from unnecessary deaths, they organize campaigns to spread the word about how birds are dying and what we the community can do to eliminate these deaths. In this effort, the NYC Audubon protects over 350 different species of birds.

New York City Audubon mixes both government assisted programs and volunteer programs. Lights Out New York was nominated and directed by the administration of Mayor Michael Bloomberg in 2005. Bloomberg's administration started this program as a voluntary program which would reduce migrating bird deaths and energy conservation. The program runs 2 times a year, once in April-May and September to November, which is predominately when birds migrate. The proposal was to have buildings turn off their lights from midnight until dawn.

The New York City Audubon was developed in 1979, and has been a very active organization ever since. The organization consist of over 10,000 members who volunteer regularly. Lights Out New York was implemented in 2005, where each year

the number of participating buildings have increased, including major buildings such as the Empire State Building, the Chrysler Building, and the Citibank building.

Projects:
Project Safe Flight is the promoter of Lights Out New York. The project consist of collecting the birds who have been injured or killed from running into the windows of taller buildings. Project Safe Flight encourages and speaks with the building managers about the dangers of keeping the lights on all night during migration. Project Safe Flight contains laboratory research and works with architectural design to figure out ways of preventing these bird deaths.

Harbor Herons consists of cleaning waters around New York City to gain a bigger population of Herons. Without this project, Herons would most likely be endangered but thanks to this program, the Clean Water Act of 1972 was passed to increase water quality and reduce heron death.

Look Around New York City is a book published and supplied to 4th through 6th graders giving them knowledge about the environment and nature which surrounds them. This is an educational book that informs the students about how kids can help the environment.

Lights Out New York was instituted in August 2005 to help prevent deaths of migrating birds. This has been a program which was implemented by Toronto to help the birds during migration. As stated above, Lights Out New York was brought by the Mayor Michael Bloomberg and his administration. The program runs 2 times annually April-May and September to November. The purpose of this is to have larger buildings reduce lighting, because during migration birds see the reflection of the windows and hit the glass and die or become injured. Lights Out New York started with a few participating buildings and five years later they have 36 participating buildings. Some of the notable participating buildings are the Empire State Building, the Chrystler Building, and the Citibank building. The program has been highlighted in the local/global newspapers and articles.

Incentives to join Lights Out New York. The main reason why these buildings are increasing in joining the movement revolves around the publicity factor. Participating buildings receive great recognition by the Audubon organization, due to the media relations and newspaper followings. The incentives took a popular media rise when the Empire State Building entered the program. Another added plus for the buildings are a building with 2.5 million square feet of floor space, turning off the lights after midnight would conserve more than 750,000 kilowatts and save approximately $120,000 this fall. Media also plays a major role as an incentive, because many news reporters and news papers publicize the program and continually mention the participating buildings. Although, people love to see the lights of the Big Apple, more recognize the environmental movement attempt to better the surrounding community.

A policy for Lights Out New York is in the midst but still a voluntary program. However, buildings are becoming more conscious about reducing unnecessary lighting. Since 2007, heavy consideration of turning this into a mandatory law has been brought about.

The mission has continued to remain on bettering the community of New Yorkers and help birds from being injured or killed. However, the organization has exponentially grown and seems to be on the uprise. The strategy of turning off the lights to save the lives of birds has been evolving, due to the knowledge and campaigning of the mission. With the larger buildings joining the program, this should spark the number of buildings. The program has also evolved by gaining support through the community, and setting up events for the community to volunteer. In order for the program to gain support, they received funding through taxes which has allowed them to expand and become one of the more prominent Audubon organizations in the country.

Summary:
Audubon New York especially Lights Out New York contain many parts that should be look at while trying to expand Lights Out Indy. The two programs both hold similar ideals, with trying to protect migrating birds, during migration times. The purpose of both programs look to increase building participation, while coming up with new technological designs to decrease bird deaths. Another similarity between the two programs is that they collect data each year to understand where the birds are coming from, whether native or migratory birds. Also, volunteers help search for new ways of helping find the injured birds.

The differences between the two programs separates New York City from Indianapolis, mainly due to sheer size. Although New York is much bigger in population, Lights Out New York uses the media and campaigns to support the program. Unlike Indianapolis, New York uses tax payers money, which allows for a paid staff to set up the campaigns and help set up volunteer opportunities for the community. The New Yorkers are much more informed about the migration of birds, which has allowed for bigger buildings to cooperate with the program. The cause for this could be because

it has been happening for 5 years.

Lights Out Indy can take many ideas from this program to gain more response from the community. A campaign and funding would help tremendously. The buildings in Indianapolis do not receive nearly the recognition the buildings of New York gain. If newspapers and new stations began to recognize and interview building managers on the point of turning out the lights, I believe the response to this program would grow tremendously. Media would help inform the problem with buildings leaving their lights on at night. A laboratory would not hurt either, where research on architectural design would increase buildings from reflecting light that leads to the birds running into the window. Getting the community behind the program would lead to the expansion of the program which would undoubtedly make the larger buildings begin to turn off their lights at night. New York had the mayor's assistance in making this become successful. If Indy could gain support from the mayor, then possibly the state house

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Name of Organization: Fatal Light Awareness Program (FLAP)
Type of Organization: Non-Profit, registered charity
Location: Toronto, Canada
Year Established: 1993

Mission: "To Preserve the Lives of Migratory Birds in Urban Areas"

Demographics:

Staff: Volunteer organization, founded by Michael Mesure.
Audience: FLAP has worked with the public, reached out to the scientific community, and (successfully) lobbied politicians to pay attention to the is sue of avian window strikes.

Funding: Based on private donation, grants, membership fees, corporate partners. (British Airways, World Wildlife Fund, Toronto Atmospheric Fund, etc.)

Incentives: Special mention/listing on website. Members ($20.00 minimum donation) receive two copies per year of FLAP newsletter.

Policy: FLAP representatives have lobbied property owners, benefited from activists, and worked with the city of Toronto. FLAP released "A Field Guide to Common Birds of Toronto", depicting the birds dead, strongly emphasizing the impact humans have in avian mortality. Led to city regulations to help reduce avian mortality.

Media: Extensive media coverage since 1993, on radio, TV, in magazines, in newspapers. In 2009, released "A Field Guide to Common Birds of Toronto", depicting the birds dead, strongly emphasizing the impact humans have in avian mortality.

Evolution: High achievement in terms of mission advancement since 1993 founding through effective advertising and lobbying.

Since 1993, FLAP has made its mark on the City of Toronto, and the realm of bird conservation as a whole. As a registered charity, FLAP relies on contributions and volunteer work to stay afloat, a strategy which has sustained the program for almost twenty years. The mission statement of FLAP is short and to the point---they make it no secret that their primary concern is the well being of migratory birds in urban areas, a problem which has become more serious along with the development of urban areas along common North American avian migratory routes. To that end, the first priority of FLAP is to help uninjured birds that are trapped somewhere in the city and release them in a non-urban area. Secondly, FLAP strives to locate injured birds and transport them to rehabilitation centers. Another goal of FLAP is to raise awareness of the problem of window strikes among the general public and residents and owners of buildings. FLAP encourages these people to keep lights turned off at night during migration season. Due to this focus on the rescue of birds, FLAP never kept record of numbers of birds/species for scientific study, nor was there a strict guideline for "bird patrolling" (time of day, length of time, specific route).
Michael Mesure, the original member and founder of FLAP, bears a large part of the program's workload. He takes responsibility for contacting scientific institutions when appropriate, for instance when donating dead birds for research purposes. FLAP relies on volunteers to patrol for dead birds, record information pertaining to species and location (on paper and/or on a tape recorder), and even inject injured birds with Dexamathasone to ease brain swelling. Live birds are placed in individual bags and released away from the city. The amount of time volunteers spend on locating and tending to birds varies from around thirty minutes to three hours.

In the area of public outreach, FLAP has accomplished a great deal. The website is designed to be educational, and the FLAP newsletter, available to those who make a minimum donation of twenty dollars, contains more information about the progress of the program. The media coverage FLAP has received has gone long way in the success of the program (see below).

FLAP has received extensive coverage from a variety of media outlets, in Toronto

and beyond. These media have included a myriad of nature/conservation publications, the New York Times, various radio stations, and news networks from CNN to the BBC. Because FLAP's focus is not research-based, contact with the scientific community is normally limited to the donation of dead birds for research. FLAP's interaction with the Toronto political community has been significant and has yielded great results (see below).

FLAP, a registered charity, relies upon personal donations, grants, and corporate sponsors to maintain operations. Their list of corporate partners is extensive, and they dedicate a page on their website to these companies that have helped them in accomplishing their goals. Their success in this area is a result of effective community and corporate outreach. Businesses seem to regard supporting FLAP as not only a charitable gesture, but also a good PR move. This is, in part, because of the emphasis FLAP puts on the popularity of birding on their website. For example, they explain that the number of people claiming bird-watching as a hobby increased by 155 percent between 1983 and 1995. While that was awhile ago, it shows a positive trend, which is attractive to businesses who want to donate to causes while at the same time bolster the reputation of their brand.

There are several programs under the FLAP name that target certain problems more specifically. Bird Rescue is the primary program of FLAP (mentioned above). Additionally, Lights Out Toronto is a project with identical aims to that of Lights Out Indy. Along that line, Bird Friendly Buildings offers specific guidelines to anyone interested in reducing a building's negative impact on bird migration. FLAP also works with the Royal Ontario Museum. After using them in bird species identification exercises, the carcasses are sent to the Museum, where they are used for a wide variety of purposes, including avian exhibit displays and tissue analysis.
Any donation made to FLAP is tax deductible and donations of at least twenty dollars buy a subscription to their bi-annual newsletter. Companies that partner with FLAP are prominently displayed on the website, offering positive PR.
Following the bold release of FLAP's "Field Guide to Common Birds of Toronto", which depicts ten species of birds dead and on their backs, FLAP started receiving more attention in the political realm. The City of Toronto passed new regulations which required buildings to be more bird-friendly. The first such legislation in North America, the regulations called for builders to "mute the reflections of windows" and/or "treat glass with a density pattern which makes it easier for birds to see it is a solid object." These rules came attached to the City of Toronto Green Standard, which calls for downtown buildings off all types ---- residential, commercial, and industrial ---- to become more energy efficient, reduce greenhouse gas emissions, and protect natural habitats. This legislation was enforced in 2009, after having been made voluntary in 2007 to help ease the transition for developers and architects.
Apart from the FLAP "field guide" (mentioned above), FLAP's website makes available a wide variety guides for the public, including bird identification guides. They have also been extensively promoted by numerous media outlets.

Clearly, FLAP has achieved a great deal since its founding in 1993. Through effective PR, good advertising, and consistent political lobbying, FLAP has almost singlehandedly transformed Toronto into North America's first bird-friendly city.

Lights Out Indy stands to learn quite a bit from FLAP. From what I understand about the aims of Lights Out Indy, FLAP represents what they hope to achieve in the long run. One of the most important things to consider moving forward will be how FLAP has presented their organization to corporations in order to gain funding. Scientific grants are also a great opportunity, which would mean stringent record-keeping on location, species, and numbers would have to happen. If this hurdle is overcome, more attention can be paid to the details of operation. FLAP's website is designed very well, and all of the crucial information is easily accessible, and understandable by people of all levels of education. Lights Out Indy may consider lobbying with local politicians in addition to encouraging building managers to switch off lights. Legislation offers a more official form of change, and legislation in this form would represent a step in the right direction in the realm of politics versus environment. Lights Out Indy should strive to utilize every form of social media available, keeping it up to date and visually engaging. News coverage, on the radio or on television, would also help a great deal in getting the Lights Out Indy name out into the public. This would, in turn, increase potential donors' interest, both corporate and personal. Teaming up with other conservation groups would likely go a long way in helping Lights Out Indy garner more volunteer support. FLAP has proven that it is possible to run a successful organization with volunteers as the work horses. If Lights Out Indy (and the students of the Environmental Practicum course) can work together to find creative ways of rising funds and increasing public awareness, the organization will grow by leaps and bounds.

Sources:
www.flap.org/flap.htm
www.thestar.com/news/insight/article/725980--this-law-is-for-the-birds
www.thestar.com/news/insight/article/725980--this-law-is-for-the-birds

VIII. Appendix A: Case Studies

Name of Organization: Smart Lights/Safe Flights Initiative
Type of Organization: Non-Government
Location: Downtown Cleveland, Ohio
Year Established: Spring 2010

Mission: To encourage building managers of downtown Cleveland to dimming or turning of decorative lights after 11pm during the two bird migratory seasons (Unofficial).

Demographics:

Staff: Director – Harvey Webster, hwebster@cmnh.org
Audience: Building managers and management association, and corporate partners in Cleveland. Especially the Key Tower, PNC Tower, and the glass covered 55 Public Square Building. Additionally, Webster reached out to Akron, Ohio, a surrounding large city in the region.

Funding: Harvey Webster is the director of the Cleveland Museum of Natural History, as well as of the Smart Lights/Safe Flights Initiative. He has some overlap in duties for each.

Projects: No Specific Projects. This is the second season of the initiative, so it appears as though they are placing more emphasis on getting their name out and gaining publicity.

Incentives: No recognition by the initiative, and no stated incentives by working with the Smart Lights/Safe Flights initiative other than saving money by saving electricity and saving birds.

Media: Since the campaign is very young, they are still working on getting their goals known in their community. They have not set up a website or published information about their initiatives. It appears as though they are reaching out by having direct contact with building managers, rather than alerting media outlets or the public. The director did talk at surrounding State Parks about his initiative which did seem to attract some media attention, and thus some news articles were published via the web.

Evolution: Currently this initiative is in its very early stages (perhaps we are more developed) and has had no time to evolve yet.

The Cleveland Smart Lights/Safe Flights initiative is one that is just entering its second migratory season. Their mission is very similar to ours, and even cites Lights Out Indy (amongst others) as reasons for attempting their initiative. This initiative follows the National Audubon Society guidelines for cities interested in dimming lights. The society recommends turning off all decorative lighting after 11 p.m. and dousing interior lights or covering windows with a film visible only to birds.

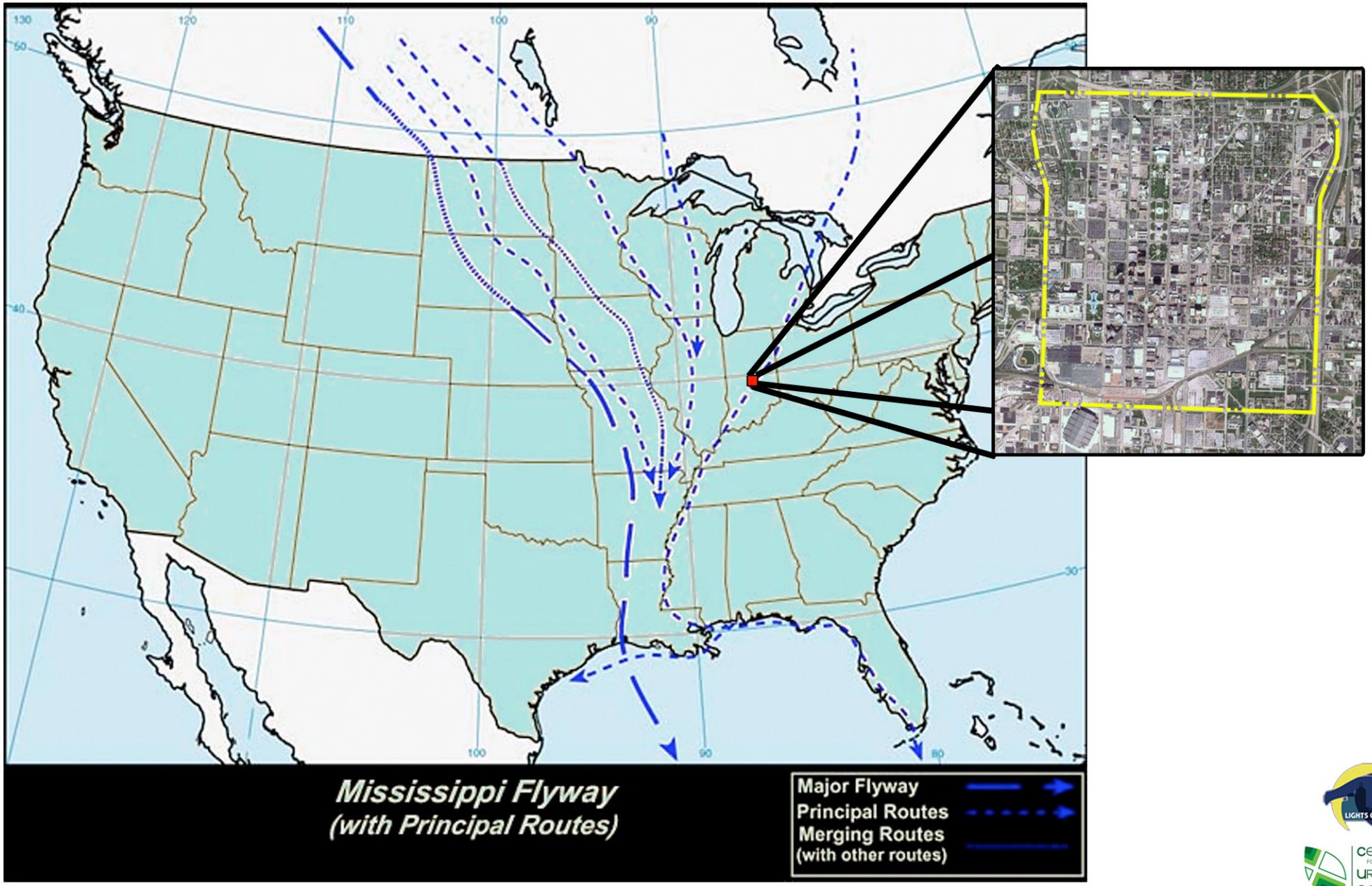
The Smart Lights/Safe Flights campaign is headed by Harvey Webster, who is also the director of the Cleveland Natural History Museum. There currently is no official website, or published initiative that could be located. There was documentation that Webster was speaking at local parks about his initiatives citing the efforts and statistics of other successful cities (Chicago, Toronto). These lectures attracted some media attention and gave the Cleveland public more information about the campaign. Additionally, Webster was also trying to encourage other surrounding cities in the region to dim their lights. Akron was cited as to have been addressed by Webster which is also a city located in Northern Ohio in a migratory bird flyway.

While there is little information detailing the actual initiative, there were some interesting perspectives that they were using to get cooperation. For example, they were encouraging building managers to have night janitors clean from the top floor down. This would allow the top floor rooms, where bird strikes are most common, be cleaned and lights turned out before it gets dark. Another interesting angle they were taking was to explain the importance of birds in the habitat. Webster was quoted as saying that birds eat pesky bugs, and if there are less birds there is more of these annoying insects. Additionally, Webster was quoted as also using the economic approach to building managers stating that they would save money as well. "If you turn your lights out you're saving energy, you're saving money and you're saving the lives of migratory birds. So where is the downside?"

Summary: The Smart Lights/Safe Flights campaign is more recent than Lights Out Indy. Therefore, much of what we can learn from them is going to be to observe if there attempts at having janitors clean from top to bottom, and if the ecological approach of the importance of birds are successful approaches in their campaign. If they are, it could be beneficial for us to use similar approaches. Additionally, we can follow their moves to avoid any potential mistakes that they may happen to make. Therefore, this campaign is definitely something Lights Out Indy should follow in the coming migratory seasons as both of our initiatives continue to develop. I have attempted to be in contact with Mr. Webster, however he has been unable to get back to me. However, I feel if he were to recognize our goal we may be able to work with him and share his resources.

VIII. Appendix B: Figures

Figure 1:
Indianapolis in relation to the Mississippi Flyway
Indianapolis, Indiana



Flyway image from http://www.birdnature.com/mississippi.html

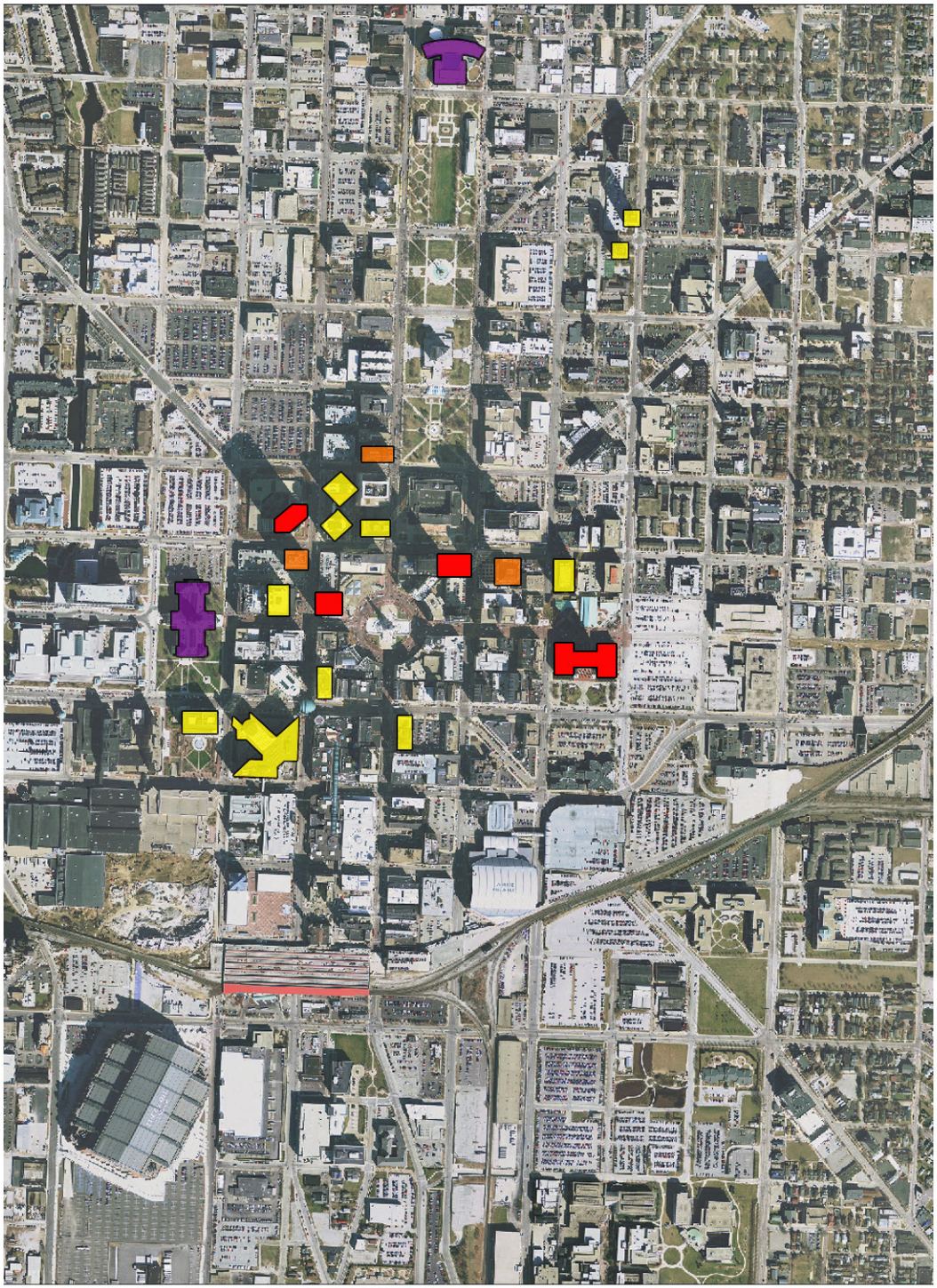


Figure 2:
LOI Identified Tallest Buildings in Downtown
Indianapolis, Indiana

Legend:

- Buildings over 125 meters
- Buildings ranging 100 to 124 meters
- Buildings ranging 75 to 100 meters

**one building under 75 meters, 8888 Keystone Building, not shown on map*

- Public buildings, below 75 meters
  Observed by LOI to have high avian mortality

0 1 2 inches

0 0.2 0.4 miles

LIGHTS OUT INDY

Center for Urban Ecology

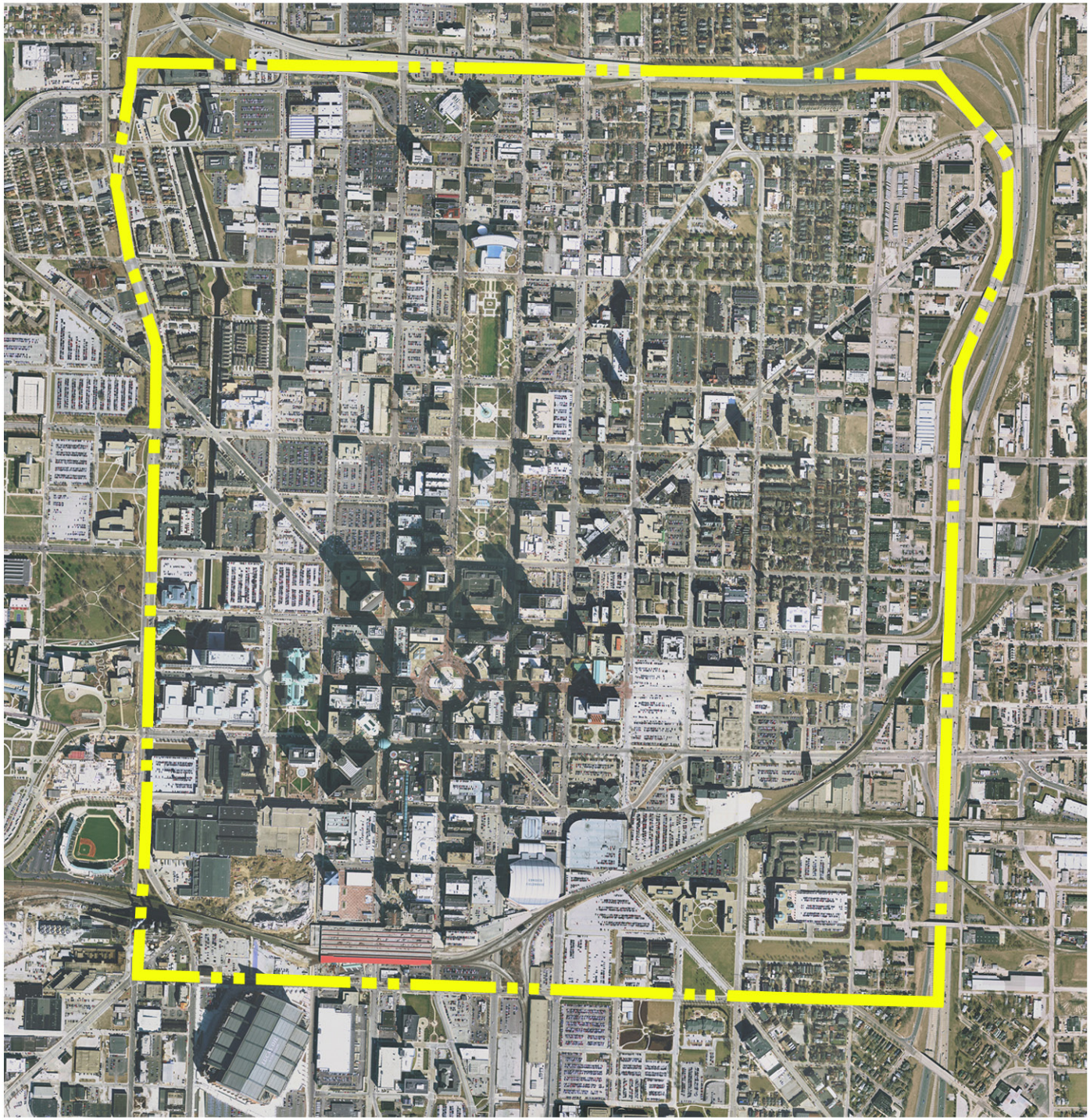


Figure 3:
Study Area for the LOI Practicum Project
Indianapolis, Indiana

Legend:

Boundary of study area

LIGHTS OUT INDY

center FOR URBAN ecology

0 1 2 inches

0 0.2 0.4 miles

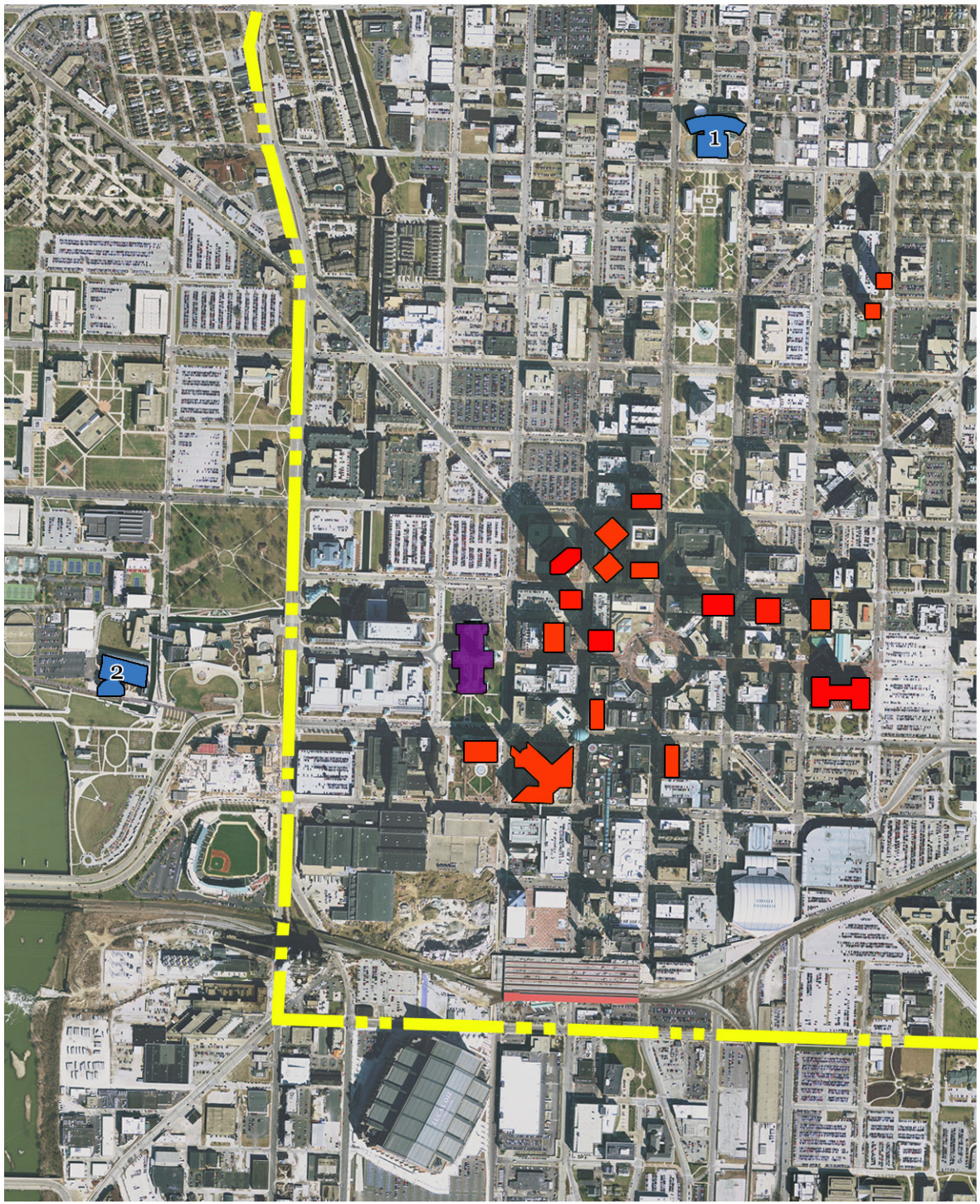


Figure 4:
LOI Participating Buildings
Indianapolis, Indiana

Legend:

LOI participating buildings

1. *Central Library, Indianapolis-Marion County Public Library*
2. *NCAA Hall of Champions (located adjacent to study area)*

Participating buildings not located within study area:
State of Indiana Forensic & Health Sciences Laboratory
Indianapolis Musuem of Art

Tallest buildings located within the study area (See *Figure 2*)

State House

Study area west and south boundaries

0 1 2 inches

0 0.2 0.4 miles

LIGHTS OUT INDY

center FOR URBAN ecology

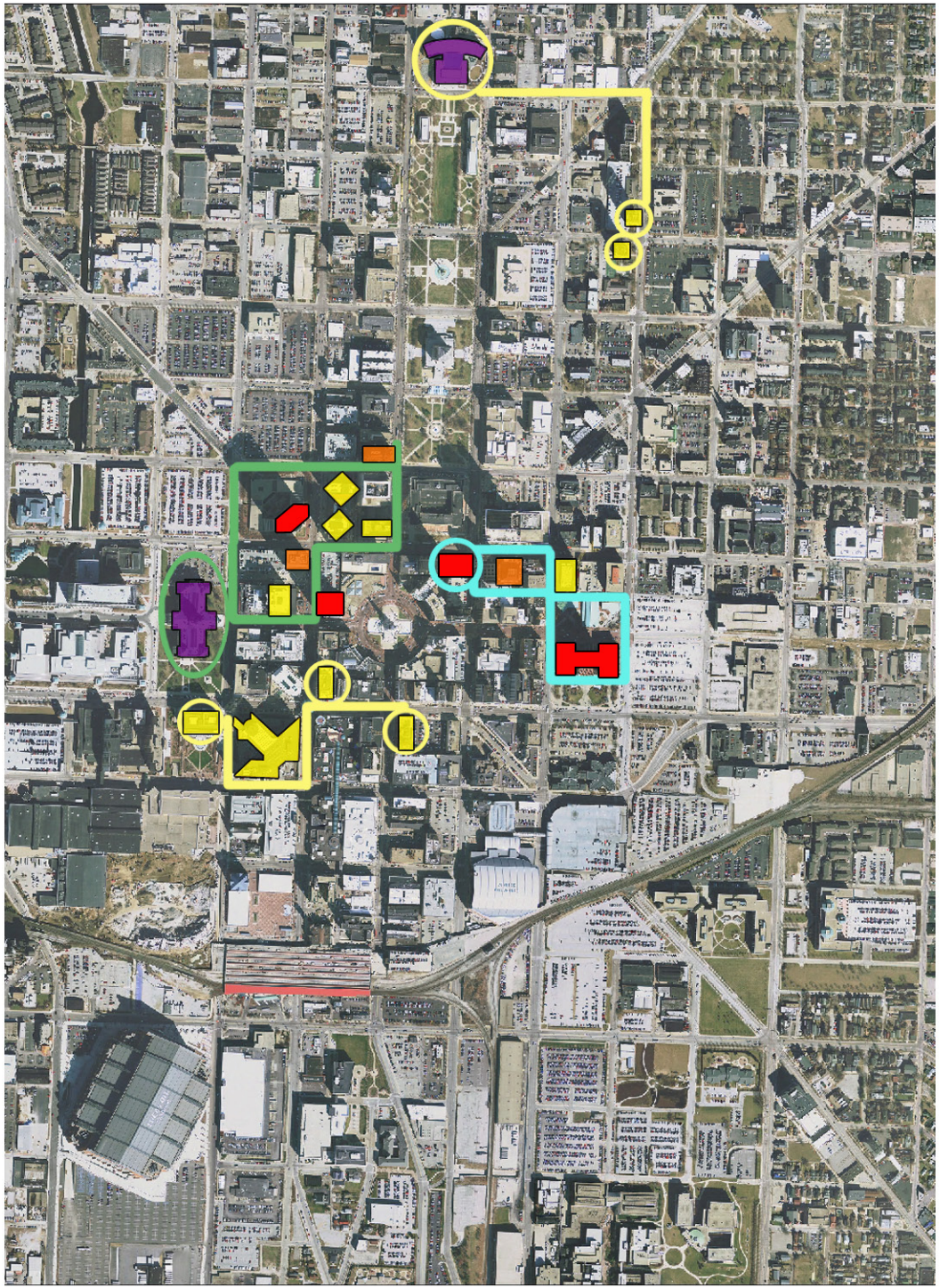


Figure 5:
Recommended Pedestrian Routes for Volunteers
Indianapolis, Indiana

Legend:

- Priority Pedestrian Route
- Second Priority Pedestrian Route
- Third Priority Routes, potential automobile
- Buildings over 125 meters
- Buildings ranging 100 to 124 meters
- Buildings ranging 75 to 100 meters
- Public buildings, below 75 meters
  Observed by LOI to have high avian mortality

0 1 2 inches

0 0.2 0.4 miles

LIGHTS OUT INDY

center FOR URBAN ecology

VIII. Appendix C: Interview Notes

Mark Zelonis Interview Notes
11/30/10
2:30 PM

1.General feedback, how has program changed things at IMA?

Not much had to change at the IMA; Some of Don Gorney's suggestions were already being instituted. The main concern was with the glass entrance, big collision risk when lit. The IMA already had a policy about keeping lights low when museum not open.

Visitor's pavilion in woods – big collision concern. No program for lighting building unless event is being held there (very rare).

2.Public reaction?

May let patrons know about participation. IMA member magazine posting? (maybe not as important as other content) possibly e-newsletter.

Influential patrons (board of governors) were made aware at a meeting

3.Advice for LOI, potential participants?

Insight for participants: If IMA/Library can do it, what about skyscrapers which contain so much more glass?

Reach out to chamber of commerce, rotary club, Kiwanis: PRESENTATIONS! Make influential people aware.

Important/attractive bird species are at risk!

Media outreach would be very helpful! Find someone with enough clout.

4.Bird strikes noticeable at any time?

At times.
Don's info was very enlightening "amazing" numbers.

Michael Mesure Interview Notes
12/10/10
2:45 PM

1.Advice for LOI?

Incentives are very important. Create excitement. Hold an event.

Celebrity endorsement

Ex: Prince Phillip visited Toronto to support FLAP.

The tenant controls the lights!

Introduce nighttime and daytime into message. Educate building managers and city representatives.

Many more birds dying during daytime. Making glass unattractive to birds. Aesthetics is a big problem with this.

Push forward and persist.

Bird Collision Symposium – education, networking. Create collective group for bird conservation.

2.Partnerships
City of Toronto

Regulations for new construction have already been accomplished, but FLAP is pushing for lighting ordinances as well.

99.9% of bird deaths occur at existing structures. Measures need to be taken not only for new construction, but also for buildings that already exist.

Background on FLAP: formed in 1993 to address birds colliding with towers. First program of its kind. First key partnership was with WWF Canada.

Birds can get trapped in urban environment after colliding at night.

VIII. Appendix C: Interview Notes

Chase Tower - Jeff Reynolds Interview Notes
Friday, 12/10/10 4:00 PM

1.Are lights on during night at Chase Tower?

No, not usually. Individual tenants (companies) may have reason to have lights on, but the general policy of the building is to have lights off at night.

2.How many tenants? Managers?

Two buildings. About 70 companies. Jeff is in charge of the entire complex. The average building (accounting for size variance) may have 30 to 40 tenants.

3.Jeff was approached a couple of years ago by a LOI rep.

4.Advice/insight, considerations:

Lighting exterior is a challenge during winter because of low temperatures. Lights are run up to the end of night time news cast

From a manager's perspective, marketing your building is very important: you want your building seen!!! (i.e. during a nationally televised sporting event. This may be a time during which lights are off at night)

There has not been an exorbitant amount of strikes on the building. Cleaners have reported finding a few birds, but not many.