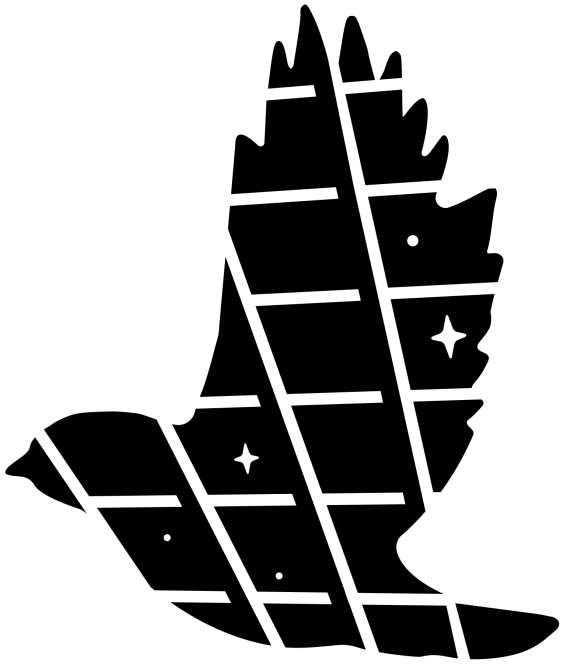
OCTOBER 29-30 2025



VIRTUAL SUMMIT

BIRD COLLISION
PREVENTION
ALLIANCE

Citation Information

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OVERVIEW

On October 29-30, 2025, the Bird Collision Prevention Alliance hosted its second annual Partnership-wide Summit. The virtual summit consisted of two half days of inspiring presentations on a variety of topics around bird collision prevention for partners and collaborators. Each day ended in collaborative and facilitated topic discussions with the speakers of the day's sessions.

Despite the government shutdown preventing federal agency partners from joining, the summit still saw an attendance of 200 individuals representing 7 countries and 35 U.S. states.

The summit brought together diverse perspectives from non-profits, local governments, colleges and universities, architectural firms, lighting design organizations, environmental consulting, and commercial industry to learn about and discuss preventing bird collisions.

This white paper summarizes presentations and discussions across the two days from speakers that have given their permission to be included.

DAY 1

Plenary: "Dark Skies for Everyone"
Michael Rhymer, Dark Sky International

Summary: Michael Rhymer speaks about the financial and energetic cost of artificial light, the creative and inspirational loss of seeing the night sky, the negative impact to human's health and sleep cycles, and the negative impact on creatures other than humans.

> ***"80% of the world lives under light-polluted skies, and 99% of the people in the United States and in Europe cannot see the Milky Way from their homes."***

Q&A

Q: Is there a preferred protocol for measuring light trespass from a point source?

A: "When we think about planning light, for new developments, it's always great to consult with a proper lighting designer to ensure that the measurements are adequate, not just to necessarily prevent light trespass, but also to ensure that the safety of the environment is met."

Above: DarkSky Principles for Responsible Outdoor Lighting at Night. Source: DarkSky

Session 1: The Economic Case for Bird-Friendly Building Design

Moderator: Leora Radetsky

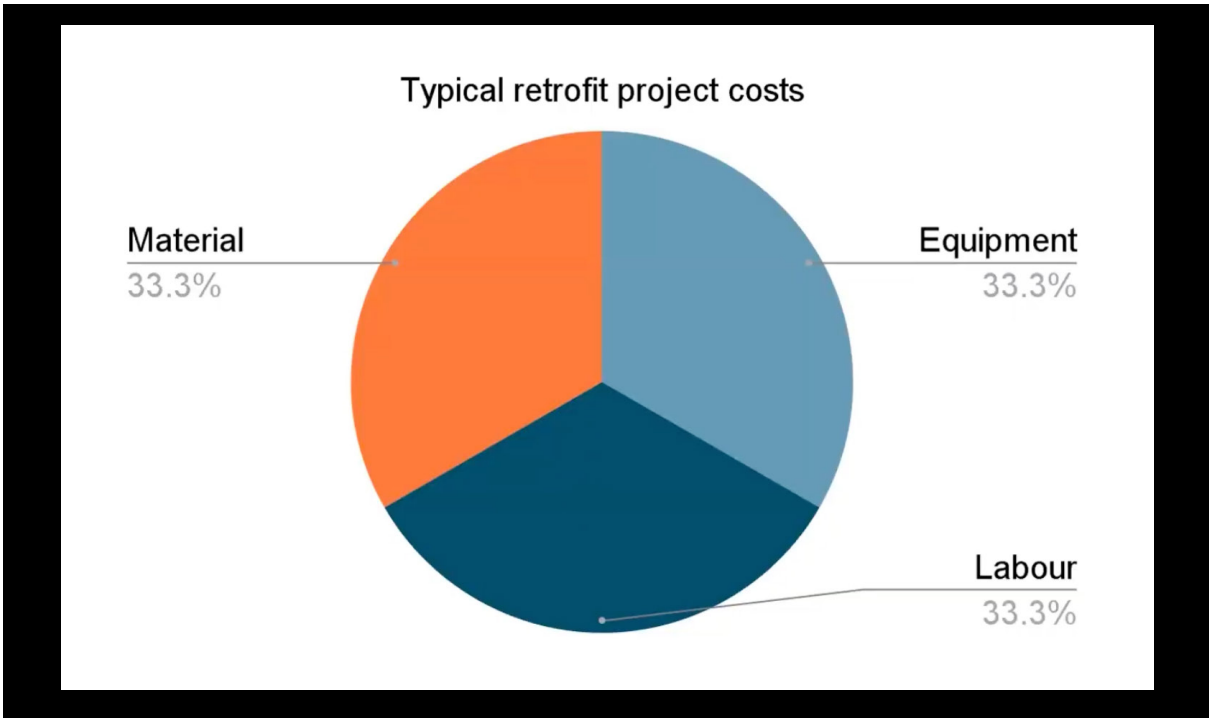
"Social enterprise models for treating glass"
Brendon Samuels, FLAP Canada

Summary: Brendon Samuels of Fatal Light Awareness Program (FLAP) Canada proposes that advocates can treat glass by acting as a social enterprise. He defines a 'social enterprise' as a business with a social, cultural, or environmental mission that is not really out to make a lot of money, but instead, that is reinvesting the majority of their profits into achieving their mission or objectives. He discusses three approaches to achieve this: treating smaller windows, integrating retrofits with other services, and leveraging existing incentives.

"We have a critical window of opportunity when a person has experienced a collision with their window to connect with them and emphasize the importance of taking action."

"We need to be able to support arguments for policy interventions and investments with marketplace analysis. What is the bird safe glazing industry worth? How many jobs are we creating? Why is this a good thing for the community?"

Above: Visual from Brendon's presentation outlining the different factors in the economic case for bird-friendly building design and which of these factors have been developed and are missing. Source: Brendon Samuels, FLAP Canada



Above: Visual from Brendon's presentation showing the typical breakdown of retrofit costs. Source: Brendon Samuels, FLAP Canada

Q&A

Q: "Are people open to these measures which affect the view in their windows?"

A: "People are apprehensive because they don't necessarily understand, so referring them to good online resources can help to soften the perceived aesthetic impact."

Q: "Are there public-facing, accessible links for comparing costs of multiple approaches and products? Something we can provide to encourage buildings to review and be less overwhelming for planning."

A: "The cost to retrofit a particular building is going to vary so much depending on the labor and the equipment. Project to project, there can be all kinds of other site-specific considerations. So, it's not straightforward for consumers to be able to compare one-to-one. There's also a variation in price point across the world in terms of supply, and various other things to do with costs, like warranty implications, that you want to be thinking about. We should advise consumers and architects to shop around and understand that there are options. Getting multiple quotes is a good practice."

"Catalyzing biodiversity on buildings"
JD Brown, Second Nature Ecology + Design

Summary: JD Brown of Second Nature Ecology + Design focuses on a recent IUCN Report on building scale and building facade, thinking about global policy, green roofs/walls, and other measures to enhance green spaces and incorporate biodiversity into the urban environment. JD talks about EU Nature Restoration Law, the UK Biodiversity Net Gain, the Berlin Nature Pack, San Francisco's Bird Safe Guidelines, and the Toronto Green Standard.

Q&A

Q: "In some ways, building greening can make window strikes worse. Are there any explicit strategies to mitigate collision risk that is exacerbated by (building) greening?"

A: "We have all of these drivers moving us towards adding greening in and around buildings. But we see less on the regulatory side of things for how we make these places safe for the wildlife that inevitably we are inviting to use these spaces. In our review of European jurisdictions, I was surprised to find that North America, in many ways, is ahead of other places in thinking about greening and biodiversity, and how to mitigate the unintended impacts on wildlife from greening projects."

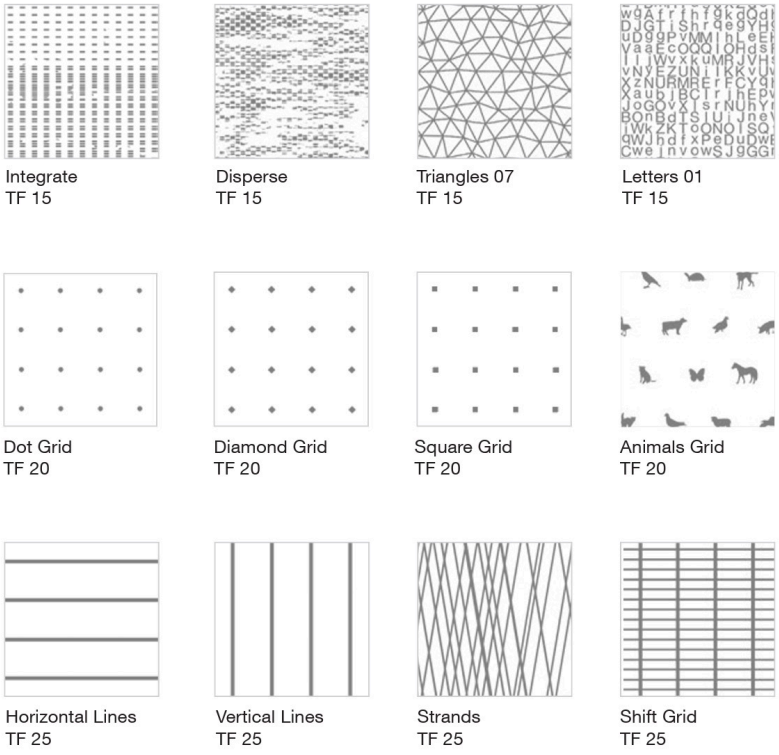
c. Longitudinal, 6, as part as the green roofs competition promoted by Institut Municipal del Paisatge Urbà i la Qualitat de Vida, Municipality of Barcelona. © Marcela Grassi; IUCN "Catalysing biodiversity on buildings" JD Brown, Kevin Vega, Robin Grossinger, Loredana Scuto

"Misconceptions of the Cost of Adding Bird-Safe Glass to New Construction"
Mark Toth, Skyline Glass

Summary: Mark Toth talks about the development and production of Skyline Glass's product SkySafe, which uses aluminum oxide powder. He also touches upon the drawbacks of manufacturing etched glass with hydrofluoric acid, including the effort it takes to neutralize the acid at the end of production and the danger of handling the acid for manufacturers. He addresses the wide perception that bird-safe glass is prohibitively costly, stating that it is on average only 0.28-1% of the total construction budget, in comparison to something such as landscaping which is usually 5-10% of a budget.

SKYSAFE™
BIRD-FRIENDLY
GLASS

© Skyline Glass



Q&A

Q: "How do you pitch this as an option to your client when it is more expensive? Saving birds doesn't always seem to win people over on the business side."

A: "One of the things that we talk about is the benefit of how we produce bird-safe glass. Being able to take a finished, fabricated, insulated unit and work directly on that number one surface (the optimal surface) is music to an architect's ears. It saves a lot of cost at the end of the day. There's also a certain amount of guilt that has to go into it, unfortunately. **The public is being made aware of this - do you want to design a building that is going to kill birds?"**

Session 2: The Social Science of Glass and Lights

Moderator: Tina Phillips

"Stopping collisions starts at home: Residents' perceptions, preferences, and purchases for bird-safe windows"

Shelby Carlson, Cornell Lab of Ornithology

Summary: Shelby gives a high-level summary of 3 different studies underway at the Cornell Lab of Ornithology: (1) A messaging experiment designed to understand which message is most or least effective in increasing people's behavioral intention, treat glass; (2) Elicitation experiment on what people (residents in particular) are willing to spend; (3) Tracking actual consumer behavior

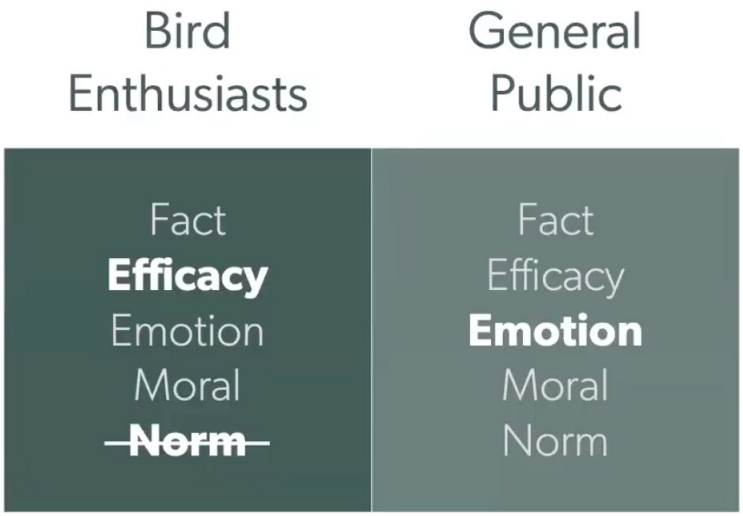
Recent publication

Shelby C. Carlson, Tina B. Phillips. (2025) "Mitigating collision-caused bird mortality through message framing: Insights from residents' intentions for bird-safe windows," Biological Conservation, Volume 312, https://www.sciencedirect.com/science/article/pii/S0006320725004756

Only two peer-reviewed studies, until recently, have been published examining how residents think and feel and behave with regard to their windows. There's a huge gap in knowledge of what people think, what they are willing to do, and how we can ultimately encourage them to adopt bird-safe windows.

There are so many different options available to folks to retrofit, but what's going to be most effective to actually get them to put them on their windows? In order to answer that question, we have to integrate social science. We have to systematically study human behavior if we want to promote more and more folks to take these measures.

For bird enthusiasts, effectiveness was the most inspiring messaging lens. For the general public, the emotional lens was the most inspiring. People were willing to pay more than it costs on average to retrofit windows. The first phase (pilot test) of actual consumer behavior didn't have enough numbers to connect any messaging to action in real-world scenarios.



Most effective messaging lens for different audiences (Credit: Shelby Carlson and Tina Phillips)

Q&A

Q: "Does socioeconomic status affect the willingness to pay for mitigation?"

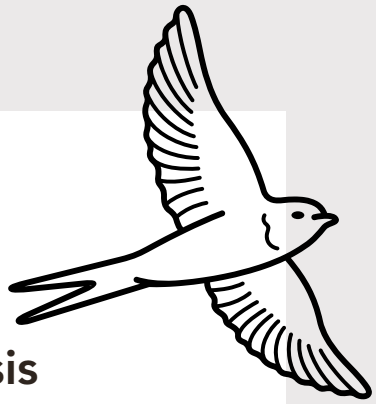
A: "Yes, in addition to quantifying what is the average willingness to pay, we did want to understand how that might vary based on people's demographics and lived experiences. In the regression models, income was shown as significant for the 'bird enthusiasts' (Merlin users) meaning the greater the income, the higher the willingness to pay. Income was not a statistically significant factor for the general public audience."

Q: "Is time expense a factor for cost? How much time are they willing to spend on windows in addition to the purchase of materials?"

A: "We didn't ask people to quantify the amount of time they would spend. However, we did ask them to rank the perceived importance of a whole host of factors that are going to influence your decision to treat your windows. These factors were cost, effectiveness of the deterrent, appearance, level of difficulty to install, permanence, as well as the amount of time needed to install it. Time was ranked as the lowest priority, and this was consistent across both the bird enthusiasts and the general public."

Q: "How does willingness to pay relate to willingness to implement and install bird-safe window treatment?"

A: "For both samples, it was significant and in a positive direction. This tells us there's validity to that measure. It's good to know that the folks who are more likely to treat their windows are the same folks who are more likely to spend more."



"Let there be light? Public differences in light pollution mitigation strategies"*

Cheyenne Black, University of Oklahoma, Institute for Public Policy Research and Analysis

Summary: This talk discusses the results from a nationally represented survey conducted by the Institute for Public Policy Research and Analysis that measures what forms of intervention the public agrees on to address problems stemming from artificial lights at night (ALAN). Overall, the survey found that partisan identity significantly affects perceptions of responsibility, with Republicans rating responsible entities consistently lower on a 1 to 5 Likert scale than Democrats. The largest gap between Democrats and Republicans appears in agreement for local or state governments to assume responsibility for addressing these negative effects; both parties acknowledged ALAN as a problem.

Republicans were found to be less likely to view state government, local government, and academics as responsible for addressing light pollution. Tested against other demographic factors, partisanship is the most consistent and influential predictor overall of who respondents believe should address ALAN in comparison to demographic information captured in the survey. Policymakers can leverage some consensus-based interventions, such as lighting technology standards or awareness initiatives to advance mitigation, even in a potentially polarized setting of environmental policy or light pollution.

Q&A

Q: "Why was the National Park Service offered as the federal entity rather than the more generic federal government?"

A: "Previous literature suggests that if we just blanket put 'federal government', it would be way more characterized by partisanship. We offer the National Park Service, which consistently is rated higher among environmental agencies of the federal government, to try to parse out some of this variation in terms of partisanship."

Q: "Why might light pollution not be as divided by partisanship on mitigation strategies the way we might see division in other environmental policy areas?"

A: "We're not seeing as strong of partisan division in terms of the mitigation strategies or responsibility assignment because there's not really a lot of party cues. We don't have political pundits talking about light pollution, and we don't have people on mainstream news saying "this is how our party feels about light pollution as a problem."

**There is no public recording of this presentation as it contains unpublished research*

Session 3: Managing Bird Collision Monitoring Projects

Moderator: Heidi Trudell

"Creating and managing an impactful bird collision monitoring program"
Katherine Chen, NYC Bird Alliance

Summary: Katherine Chen shares her perspective on how to create an impactful collision monitoring program that is sustainable in the long run, based on the experiences of the NYC Bird Alliance's collision monitoring team, which has been monitoring collisions in New York City for over 25 years. She also touches upon all the reasons collision monitoring data can be useful to advocacy efforts for bird conservation and the challenges collision monitoring programs can face.

When used correctly, standardized collision monitoring data can help us better understand the extent of collisions, and it can also help us identify priority areas to address at individual buildings. Having that information [collision data] available when you're speaking with building owners and managers goes a long way in getting mitigation measures in place. The data can also be used to advocate for bird-friendly legislation. But collision monitoring takes dedicated time and sufficient data and can be emotionally and physically taxing. These programs need a database to safely store data, strategic planning, standardized protocol, volunteer recruitment, management, and training and appropriate permits and space for storing specimens (if collecting specimens is a part of the program).

Q&A

Q: "Can you give examples of buildings that have, quote, research value? What questions are you trying to answer? Have you gotten any answers to your questions?"

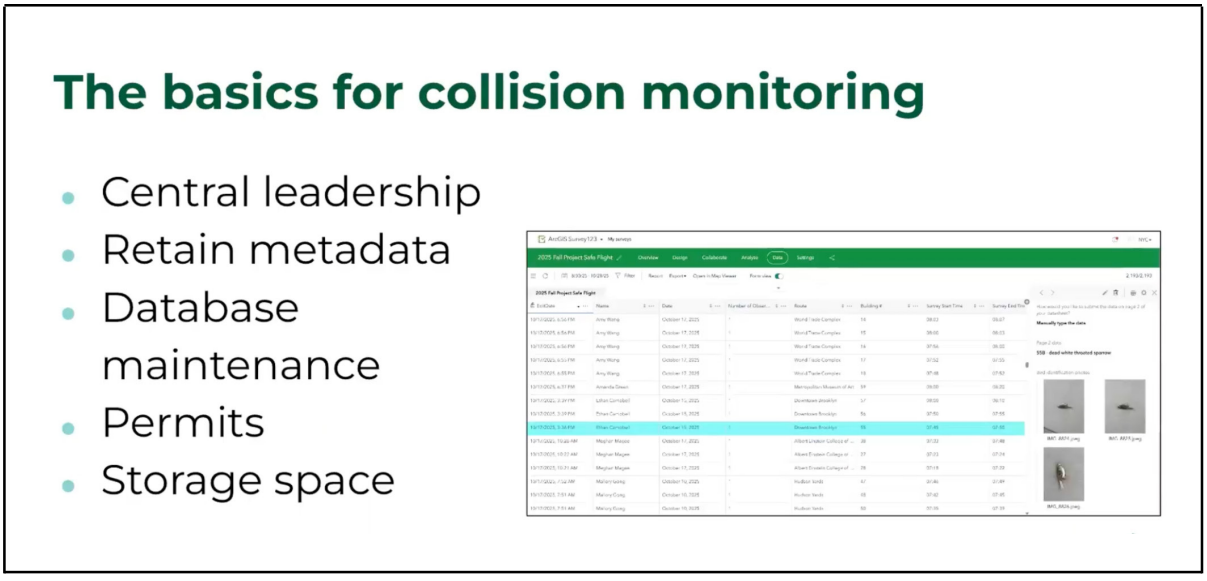
A: "Our research questions can be at multiple scales. So you can look at individual buildings and see where and what is an effective collision prevention method, for that specific building. You can also look at broader scales. So, for example, looking at how different weather conditions and migration traffic impacts collisions, which requires data from the city at large, not just at a specific building or a specific type of building."

Q: “Has the number of collisions changed over the years?”

A: "Collisions vary year to year. There's a lot of factors that impact them. If you're just looking at the general numbers of collisions that we're finding, it's increasing because we are now serving more buildings than we were 5 years ago. It's really hard to look at that data and see those trends clearly. I would say, though, when we're monitoring, we do continue to monitor any buildings that have put retrofits into place, and really happy to share those areas, we do see significant reductions in collisions."

Q: “What's your elevator pitch for potential volunteers?”

A: "I am not going to say an elevator pitch right now, but, some important things to include is the impact of what they would be contributing. To let them know that even though this is a really difficult thing, and that it’s understandable if it's not the way that is best for them to contribute, they would be contributing to real change and protecting birds through their involvement." (Melissa added here that she finds photos of dead birds and emotions of sorrow and anger are good motivators.)



Credit: Katherine Chen, NYC Bird Alliance

"Reflections of a collision monitor: 11 Seasons documenting window strikes in NYC"
Melissa Breyer, NYC Bird Alliance

Summary: Melissa Breyer is a collision monitor volunteer for Project Safe Flight and as of this presentation has documented 3,061 window collisions in New York City, mostly in the Financial District, over the course of 11 monitoring seasons. In this presentation she shares what brought her to monitoring and her experience as a volunteer monitor.

"I now walk around the city constantly looking for birds, even when it's not migration season. I just automatically am looking."

Credit: Melissa Breyer

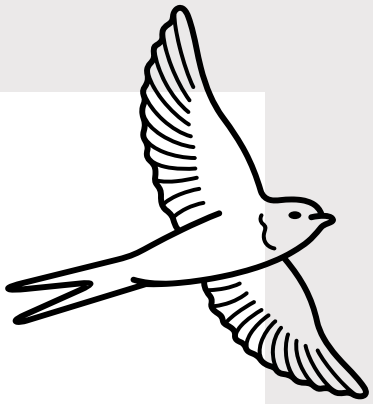
Q&A

Q: "What's the success of rehabilitating the injured birds?"

A: "For Melissa, it's usually between 50 and 60%. Heidi Trudell added that for Cleveland, they're in the ~80% range and for low-rises in Washtenaw County the number is closer to a 35% survival rate."

Q: "After 11 seasons, what are the most surprising or counterintuitive things you've learned about bird collisions?"

A: "I'm sure there's probably a reasonable answer for this, but, some facades are so bad one year, and then totally fine for 3 more seasons, and then a facade I've never seen a bird at before will be the worst facade one season, and it's always very surprising." (Heidi Trudell added: "I've found that sometimes those kind of quiet years correlate with rat populations and, not controlling the populations, and then when they do their pest control, the numbers go back up.")



"Maximizing the scientific utility of museum specimens from collision monitoring"

Benjamin Winger, University of Michigan Museum of Zoology

Summary: Benjamin Winger discusses what happens with dead birds after they end up at a museum ("salvage specimens"), why it is important to bring salvage specimens to museums, and how to manage relationships between collision monitors and museums.

"These collections are essential resources for studying ecology, evolution, and conservation. This is an incredibly unique record of life on our planet."

- We can get data on the pathogens and parasites that come in with the birds to try and understand their health.
- With technology like CT scanners, we can image birds, and image other specimens in really high resolution in ways that weren't possible before.
- When we get bird specimens now, we're not only saving the skin or the skeleton, we're also saving tissue samples that are useful for a variety of genetic work, as well as research on pathogens.
- We have records of the chemical environments that the birds were in, and what they were eating.
- We can look at changes in timing of migration based on these records, and create a time study of species.
- There are some challenges: Museums, like collision groups, are underfunded and understaffed. This kind of specimen preparation takes quite a lot of time and skill, and not all cities or locations are going to have an active collection.
- It's important to speak with museums about donating salvage specimens before doing so.

ECOLOGY LETTERS

Letter | Full Access

Shared morphological consequences of global warming in North American migratory birds

Brian C. Weeks, David E. Willard, Marketa Zimova, Aspen A. Ellis, Max L. Witynski, Mary Hennen, Benjamin M. Winger

First published: 04 December 2019 | https://doi.org/10.1111/ele.13434 | VIEW METRICS

The peer review history for this article is available at https://publons.com/publon/10.1111/ele.13434

"Smaller bodies, longer wings, earlier migrations: Untangling the multiple impacts of climate warming on birds" -Michigan News

Q&A

Q: "How can someone be trained as a preparer for specimens for collections?"

A: "I'd recommend reaching out to any nearby collections. For example, here at Michigan, we've hosted people, from nearby smaller universities in workshops, for a couple days a week to kind of give a crash course in training. Museums need a lot of volunteers, so maybe there'd be an opportunity to either go to another museum, or have someone come in for a couple days, too. At least go through the basics. And there are some things that can be learned pretty quickly."

Q: "What are the USFWS permits for specimen collection?"

A: "Fish and Wildlife has, to some extent, relaxed permitting requirements for picking up the birds, but to keep them long-term, they really need to be going to an educational facility or a research university that has specific permits. And also, there may be state-level requirements."

Session 4: Databases for Monitoring and Data Collection

Moderator: Tim O'Connell

"Why are North American birds declining?"
Simon Tye, University of Arkansas

Summary: Simon Tye compiled and coded the largest database of North American bird deaths by synthesizing 7 databases maintained by government employees, academic researchers, conservationists, and community scientists. This synthesis contains over 8 million fatalities across over 800 species over the last century recorded by United States Geological Survey, U.S. Fish and Wildlife Service, New York City Bird Alliance, FLAP Canada, iNaturalist, and several peer-reviewed publications. Using fatality synthesis and abundance data from the 3 Billion Birds paper, (Rosenburg et al. 2019), he addresses four questions in this talk:

1. Why are birds declining?
2. Why are birds dying?
3. Where are deaths documented?
4. Where are deaths under or overrepresented of specific species and specific regions?

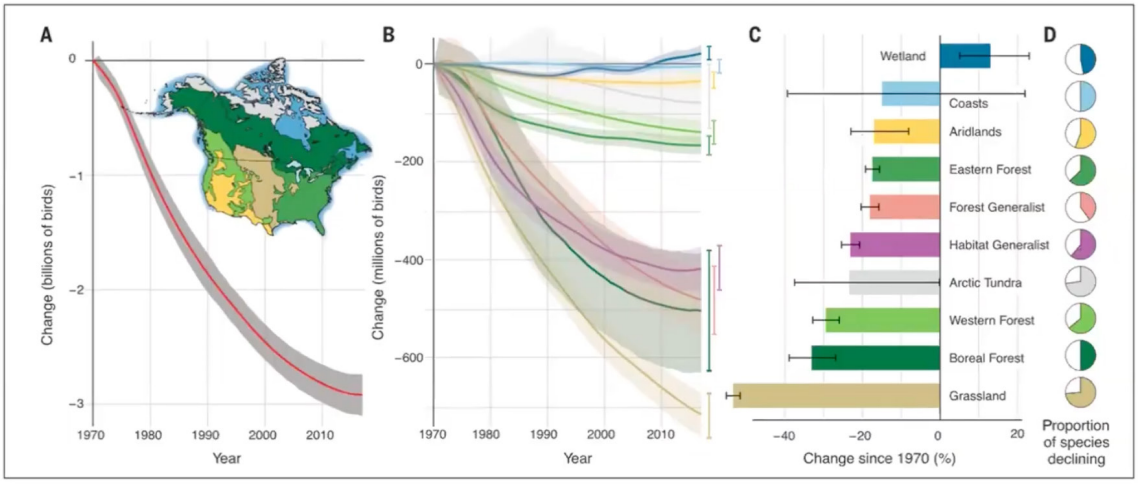
Some takeaways:

- Most fatalities were recorded in the eastern half of the United States, which was expected given the high human population density.
- Indication that high mortality rates are hindering the recovery of declining bird species.
- Across both declining and gaining species, there were more fatalities attributed to infectious disease, anthropogenic or human-based factors, and multiple stressors, or a combination of multiple main cause types

"The abundance of North American birds has declined by about 3 billion individuals from 1970 to 2016. It was recently reported that 61% of all bird species globally are declining. Overall, most species in nearly every biome have declined. This is a global conservation issue and not a national issue."

North American bird abundance has declined by

~3 billion individuals (~29%) since 1970.



Rosenberg et al., 2019. Science.

Q&A

Q: "How did you control for differences in sampling effort across time or geographical region?"

A: We couldn't control for sampling effort because that information wasn't available across databases. As for accounting for effort over time, we included years of covariate in our models, which would account for annual variation to some degree. Additionally, based on the 3 Billion Birds paper, the rate of bird loss has slowed. Although there are more individuals documenting dead birds over the past couple of decades, there would be fewer dead birds to document if fatalities were associated with abundance loss. So just by the rate of decline, that will kind of negate that effect to some degree. That said, future studies should be able to improve on those with better data.

Q: "Your work could lead to a shift in the way large organizations approach conservation of bird populations, because it demonstrates the need to focus on reduction of mortality. Do you have any thoughts on that? What do you see as the biggest barrier to this new framework gaining any momentum?"

A: I hope it'll direct more resources towards stopping bird deaths. There surely is a change in birth rates with habitat loss etc, but mortality rates play a big role. The biggest barrier is that cash rules everything around us. I think businesses donating money is the biggest barrier. But I think together we can make small changes by fixing up our houses and convincing businesses that we know to make the right decision.

"Make every collision count: Tools, programs, and opportunities for improving data collection and reporting"

Kaitlyn Parkins, American Bird Conservancy

Summary: In this presentation, Kaitlyn Parkins of American Bird Conservancy (ABC) first discusses the value of collision data collecting and the different ways collision data can be used in advocacy. She then provides advice, suggests tools and platforms to use, and defines important fields to record when collecting data to best ensure consistency and comparability in data use.

"Local data collection, whether it's structured or informal, is valuable because it translates broad science into site-specific actions. It can help make the problem visible to decision makers, it can help connect people emotionally to this issue, and it can pinpoint the highest impact opportunities for action and limited, limited resources, where we direct our time and effort, and importantly, our money."

Key Takeaways:

- If you are collecting data, these fields are essential to ensure consistency and comparability in use: Date, time, lat/long coordinates, specific facades, or the height of the building, if you can determine what height the bird collided with.
- For incidental reports, include as much of this information as you can. Even if you don't have survey time or effort, maybe you have multiple photos that you can provide.
- Using consistent taxonomic systems is really important.
- When you are analyzing data, reporting birds per survey is a really great way to look at differences over time and before and after retrofits.
- Use public databases and publish full datasets when possible.

Type	Description	Strengths	Best For
Incidental	Opportunistic, ad-hoc	Broad participation, wide coverage	Awareness, identifying hotspots, early advocacy
Systematic	Structured, repeatable surveys	Comparable, research-grade data	Evaluating retrofits, scientific studies

Types of Collision Monitoring Credit: Kaitlyn Parkins

Q&A

Q: “eBird generally disallows the entry of deceased birds, does anyone have any thoughts or new information on whether or not that's still the case?”

A: (Tina Phillips) "eBird has become the platform that it has mostly because it works hard to serve the needs of birders and researchers. If they knew that this need really did exist, and there was enough pressure, who knows? I would encourage you all, if you are e-birders, to contact those project leaders and mention this idea to them. They're very good at listening and providing the tools that birders and researchers want."

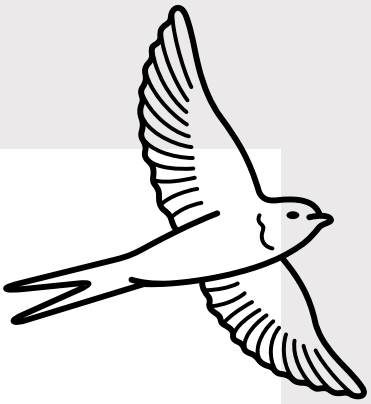
Q: “Are there any online platforms you'd recommend for including stories, or more descriptive, that sort of storytelling, avenue you sort of ended with?”

A: "I think iNaturalist does allow some commentary. (Brendon Samuels added that he started an account for FLAP on iNaturalist with that purpose in mind.) DBird does allow for notes and comments, but they're not public-facing, ArcGIS story maps can be really useful for sharing those data, but that's not necessarily a broad, all-encompassing database that people are trying to submit to."

Q: “For community groups who could use a hand with taking their collected data, what's the best way to seek some support for that?

A: "I would say reach out to your local larger organizations. If you've got a state chapter of Audubon, that may be best. If you're in Canada, FLAP might be the answer. The American Bird Conservancy is always here to help. I would reach out to some of the organizations that have more capacity and that have staff dedicated to these projects to get advice on how to do it, how to manage it. I really do want to emphasize the ability to publish these datasets in data journals so that you're always credited for your work and so that it's easy for scientists to find. If anyone wants to reach out, I'd be happy to help, put those together, determine what journal would be the best fit, and so on." (Contact: kparkins@abc.org)

DAY 2



Plenary: "BirdCast: Large-scale migration information for dynamic conservation"
Adriaan Dokter, Cornell Lab of Ornithology

Summary: In his plenary talk, Adriaan discusses how radar is being used to track bird migration through the platform BirdCast, how bird migration and weather can be inter-related, the impacts light pollution is having on migratory birds, and BirdCast's tool offerings and how to use them.

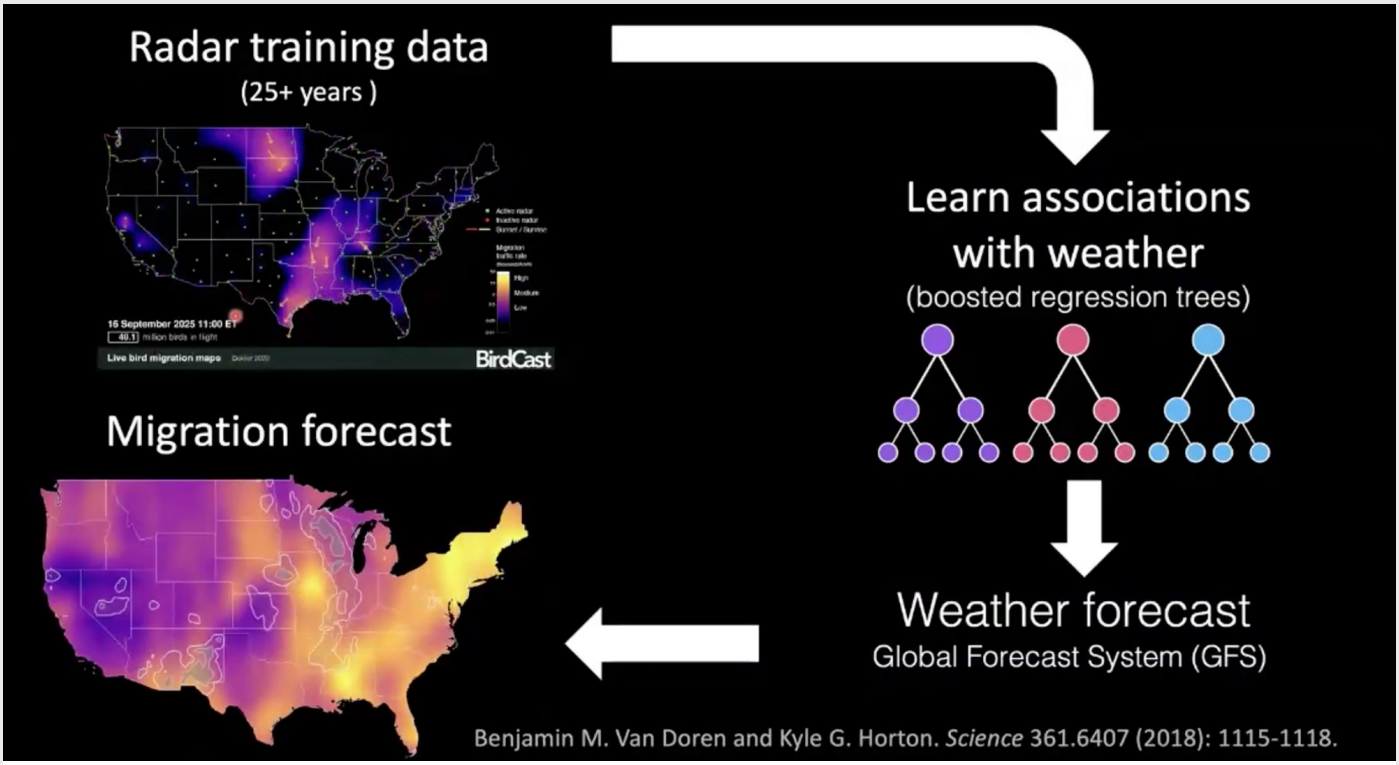
> ***"80% of North American migratory birds migrate at night, and the light-polluted landscape they now have to traverse can be very dangerous"***

> ***"When migration alerts are paired with advocacy messages such as "dim lights at night" and "treat glass by day", we can use the interest in bird migration to inform and empower people to protect birds."***

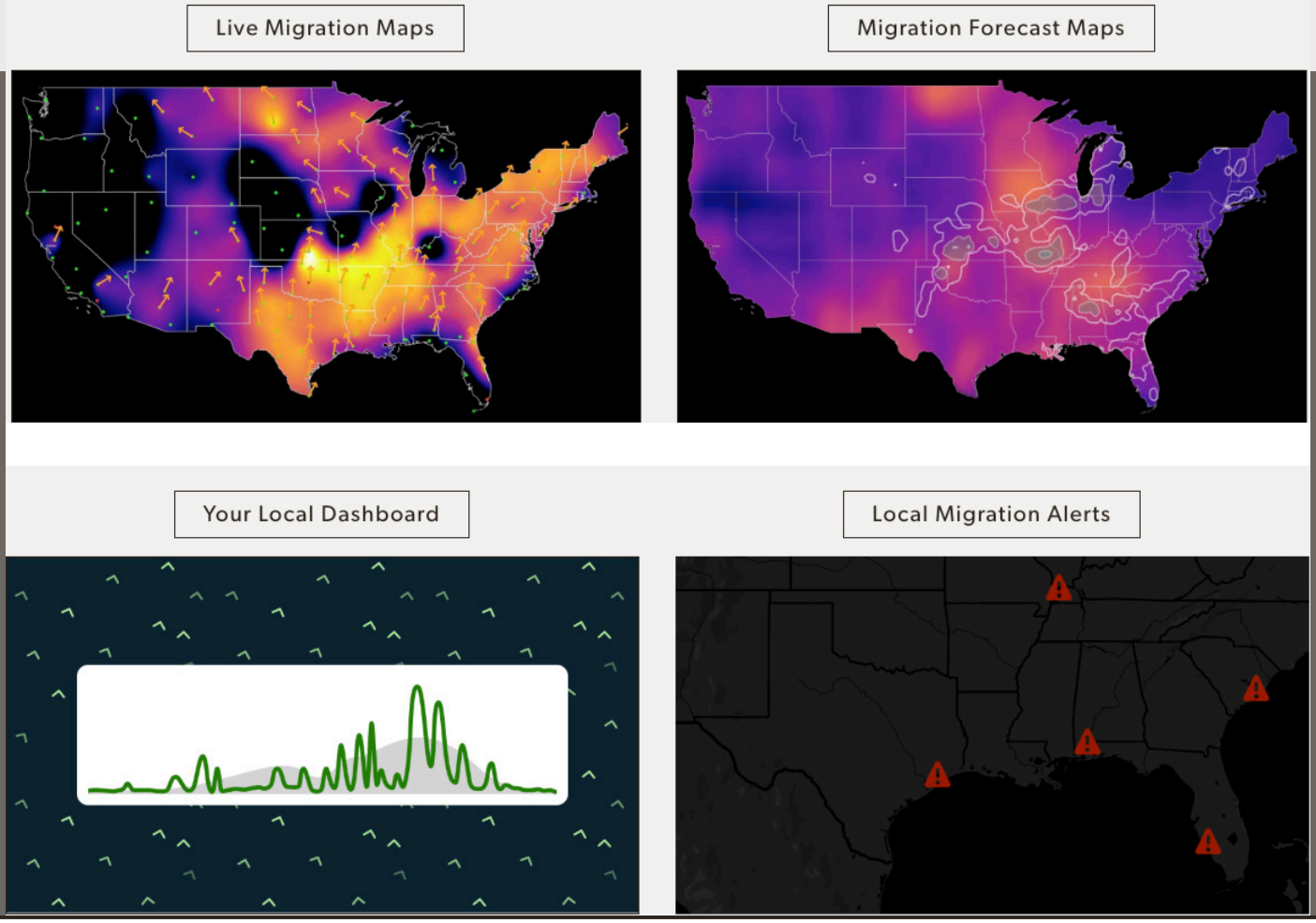
Q&A

Q: "Are there any similar efforts to track and forecast migration in Canada and Alaska? And similarly, what about Central and South America?

A: "We have very active discussions and data pilots already with our friends at Environment and Climate Change Canada. There's mostly logistical issues that stand in the way. We need to have real-time access to Canada's radar data. For Alaska, we have been hesitant because there's a lot of insects moving there. We've done some studies there and I think the data is there, so its on our priority list. Same with Puerto Rico, where there's also radar. Funny how complex things get once you go to other counties with data formats and real-time data streams. I think we all have the ambition to eventually have a global monitoring system for all weather radars in the world."



Above: How BirdCast forecasts are made (Credit: Adriaan Dokter)



Above: BirdCast tools on birdcast.org (Credit: Adriaan Dokter)

Session 5: Lighting Policy, Guidelines, and Innovation

Moderator: Mark Grosz

"Bird-Safe nights on a budget: Lighting policies and guidelines that may* cut collisions and costs"
Leora Radetsky, DesignLights Consortium

Summary: Leora Radetsky of DesignLights Consortium (DLC) gives context about qualities and characteristics of light including the rating system of the Illuminating Engineering Society, lighting zones, and lighting guidelines and policies. She also addresses bird-friendly recommendations for lighting and how bird-friendly lighting could cut costs.

The primary ways that outdoor lighting is regulated in the U.S and Canada is with energy codes and with state or local ordinances or bylaws.

Energy Codes

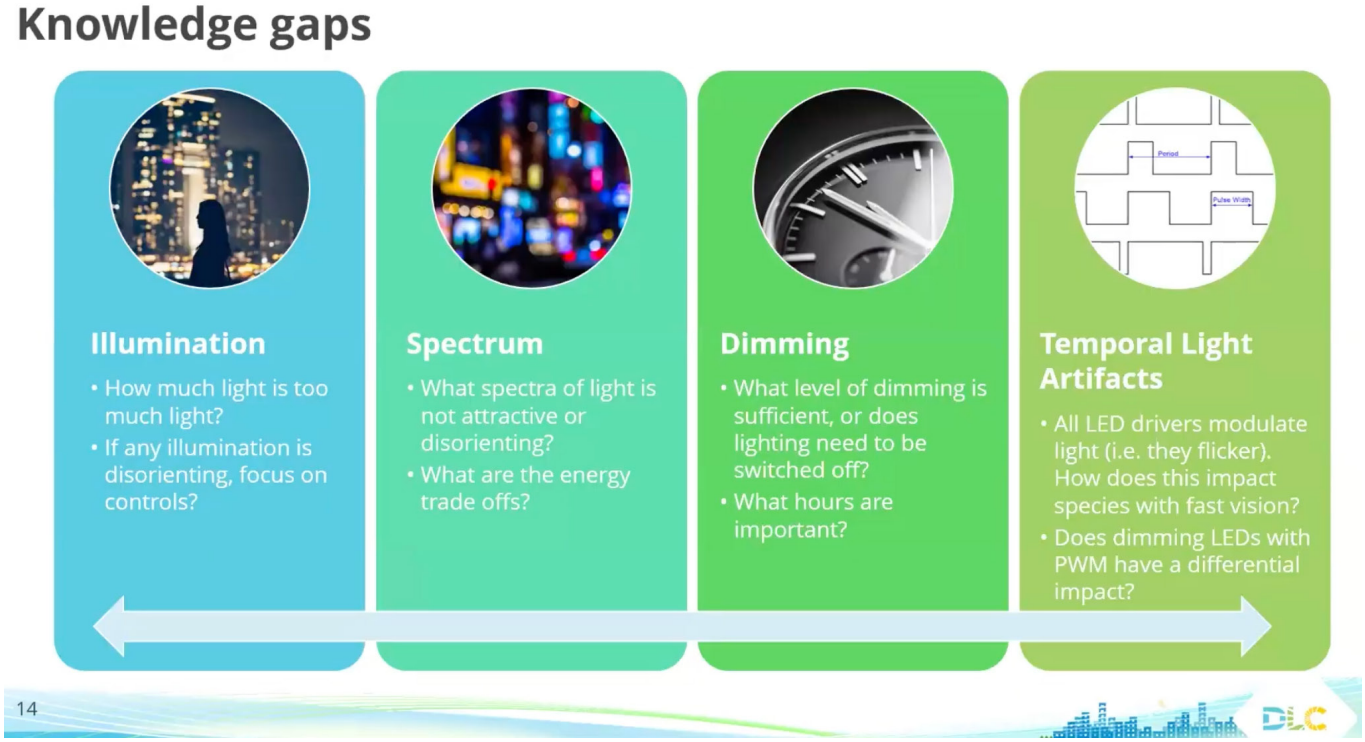
- In the US, we have two model energy codes that are updated on a three-year cycle.
- Some incentives for energy efficient lighting include recognition for participation in voluntary programs like Lights Out campaigns, Bird City Network, LEAD, and Well.
- Older energy codes can be adopted long after they are replaced by newer energy codes.
- States don't have to adopt model energy codes.
- End users only need to meet their state energy codes when significant alterations are made, or for new construction. In practice, it means that minor upgrades are often made in order to avoid code requirements and significant investment.
- Enforcement is a significant challenge for energy codes, like it is for ordinances.
- Energy codes focus on energy savings so other improvements, like light pollution minimization, may be important to some energy codes but not to all codes.

Lighting Rebates

- Beyond energy code requirements, lighting rebates provide a monetary mechanism for reducing energy use and light levels further.
- Utilities and energy efficiency programs in most states in the U.S. and many provinces in Canada offer lighting rebates for energy-efficient lighting.
- The advantages of ordinances with prescriptive metrics is that they are easy to report and easy to enforce. The disadvantage is that they don't take into account the variations in outdoor lighting geometries.

Ordinances

- Ordinances with performance-based requirements can be easily implemented by subject matter experts who know what they're doing, but they typically require more specialty tools for design and enforcement, and as such are more expensive and more complex to enforce.
- We understand that we should limit blue-violet light outdoors to limit sky glow but we have a lot of knowledge gaps with regards to bird-safe, or even bird-friendly lighting.



Knowledge Gaps for Bird Safe Lighting. Credit: Leora Radetsky

Q&A

Q: "Can you comment on the recent segment on NPR regarding a study at the University in Utah suggesting that simply using LED exterior lights reduces glass collisions?"

A: "I haven't seen that study. In general, LED lighting is not going to reduce bird collisions, for a number of reasons. At macro scales, it increases sky glow, so it creates a brighter sky for birds to be attracted to. At microscales, we don't know all the complex interactions between spectrum, illuminance, and behavior, but I would imagine that it's not going to be an improvement."

Q: "Are there major barriers to using motion-activated street lights that can just turn off if no one is around needing the light?"

A: "Overall, I'd say they're not major, but one of the challenges we have with low-cost sensors, especially passive infrared sensors (which are commonly used outdoors) is that what they see does not match the lighting optical distribution of the luminaire it's attached to. You end up having dead bands in between the luminaires, so the coverage area of the sensor is smaller than the coverage area of the light. And so, if you're walking around the edges of what the occupancy sensor sees, it may not pick up a person. Cars travel fast so the biggest risk is cloud latency (how fast the data gets to the cloud). If a pedestrian is walking slowly or stopping they may not be seen by the occupancy sensor. They're gonna have to make really overt, large motions to be seen, or move across this passive infrared zone to be seen, and that is a risk. What you end up having is higher dimming levels to make sure that that occupant can still see around them and be seen by other pedestrians and by drivers."

Q: "Is there any attempt to reach light sources from ships and boats?"

A: "My understanding of maritime regulations is they have minimum lighting requirements for safety and for visibility, but no maximum requirements. I think the BCPA Coastal and Offshore Lighting Working Group is working on this. I know that they have limitations in dimming, so the solutions for them often have to be simpler, which is something that the new cruise ship guidance speaks to."

Key Terms

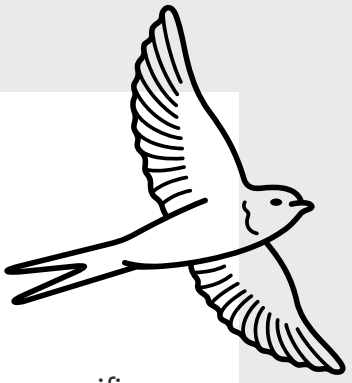
DLC is a non-profit that provides decision makers with tools to reduce energy consumption, carbon emissions, and light pollution.

Lumens weigh the total light output in terms of the human response.

Correlated color temperature describes the color appearance of a light source and is given in degrees Kelvin.

Bug ratings are a prescriptive rating system from the Illuminating Engineering Society, or IES. They represent a light source's optical distribution pattern in terms of three classifications: Backlight, or B, plight or U, and glare or G. Illuminaire with zero uplight has a U0 rating.

Lighting zones are exterior environmental zones where lighting is expected, and these zones set programmatic constraints on the attributes of exterior lighting.



"Better outdoor lighting choices aren't just for the birds"

Scott Lind, Kickapoo Valley Dark Sky Initiative

Summary: Scott Lind explains the concepts and impacts as well as showing specific examples of lighting retrofits and product choices that help save energy, reduce glare, benefit wildlife, help prevent light pollution & preserve our night skies.

Five Key Questions to Ask About Your Lighting:

1. Is it shielded?
   - Shielding light helps decrease sky glow.
2. What color temperature is it?
   - The same amount of lumens with a high blue content can have a much larger sky glow impact. A blue content of 2200K or lower is recommended.
3. What is the quantity of light? How does it look under different conditions?
   - Sometimes adding more light decreases visuals at night and decreases safety due to glare and increased shadows.
4. How often does the light need to be on? How do you control it?
   - Controls like motion sensors and dimmers can help reduce sky glow in scenarios where lights need to be on at night for safety and navigation.

Five Recommendations for Better Outdoor Lighting

1. Investigate available incentives in your state.
2. Only install lower color temperature fixtures (2200K or lower).
3. Only install zero up-light fixtures.
4. Only install as many as you need to meet the IES standard.
5. Wherever possible, add controls (ex. Motion sensors, dimmers).

Q&A

Q: "My agency's lighting policy guidance currently recommends 2700 CCT and nothing higher than 3,000 for lighting. Do you know of any municipalities or other government institutions that have policies requiring use of lower color temperatures?"

A: "The only one I'm aware of is a new ordinance in a township south of Madison, Wisconsin, that now is not going to permit any street light above 2200K. Hawaii provides some good examples of counties that have ordinances that require very low blue lighting. There's some exceptions carved out for different types of lighting, but in general they require their lighting to be no more than 2% blue. I think we're a ways away yet from many ordinances incorporating the lower CCTs as maximums."

Session 6: Curricula for Bird Safe Buildings

Moderator: Cady Netland

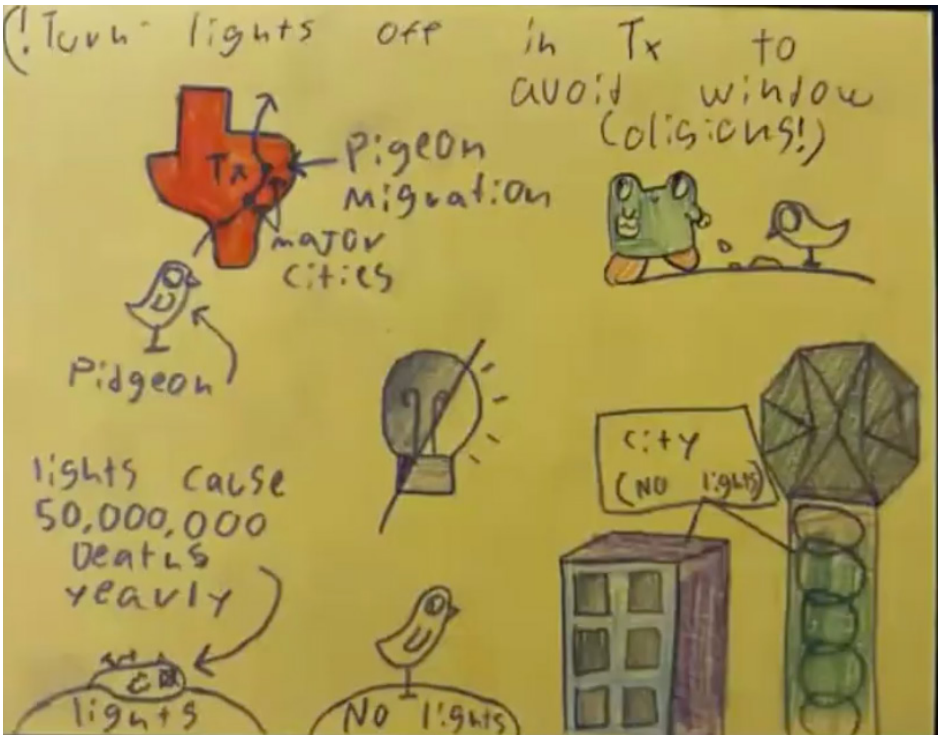
"Lights Out, Texas! Curriculum: Inspiring stewardship through inquiry-based learning"
Hannah Ledermn, Texas Conservation Alliance (TCA)

Summary: Hannah Lederman talks through curricula that was created for Lights Out Texas in partnership with Travis Audubon and Defenders of Wildlife. This included modules created for 3-5 grades and 6-8, outreach toolkits developed for local educators around bird safety, and a bonus story game called "For the Birds" created in partnership with Maritimus Magazine.

Lights Out, Texas! Curriculum Link:
https://act.audubon.org/a/lights-out-texas-curriculum

About The Curriculum

- In the 3rd through 5th grade lessons, the students learn about bird migration, how to help birds, and why birds matter.
- In the 6th through 8th grade lessons, the students learn about adaptations for migration, disruptions to energy flow, and solutions for biodiversity.
- Both groups learn about bird-glass collisions. The lessons also have specific information about birds migrating through Texas, and light pollution in Texas.
- At the end of the curriculum students draw pictures about what they've learned and write letters to their city council members advocating for the protection of migratory birds and implementation of bird friendly policies.
- "For the Birds" is a story game where players get to pick a character, then that character makes decisions that affect migratory birds, and see how those decisions affect the birds from the bird's perspective.
- The TCA is also currently developing an outreach toolkit for informal educators who want to teach about lights out efforts.



Student Work for TCA Curriculum. (Credit: Hannah Lederman)

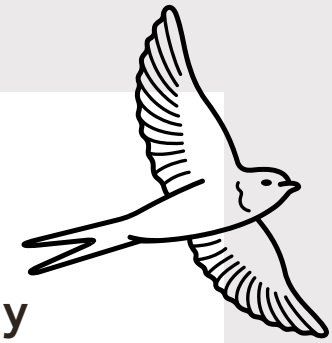
Q&A

Q: “Would you mind describing a bit more what's in the disruptions to the Energy Flow module that you have?”

A: "All our lessons are aligned with the Texas learning standards, and all of our curriculum is free to download and look at. This one goes into iNaturalist data, not only for the Lights Out Texas Monitoring Project, but also for where the actual activity is."

Q: "Has the emotional heaviness and material of this course ever come up as a concern for the students involved? Is there any concern about the emotional impact and whether it's had any impact on participation or willingness to take on this curriculum?

A: Our curriculum just launched at the end of the summer, so this is our very first phase of having it implemented in school systems. We have plans to reconnect with the teachers that have downloaded it and gather their feedback, but we haven’t gotten to a point yet where I have that feedback to share with you. What I’ve noticed from talking about those types of things at tabling events is that a lot of kids are okay with it.



"Teaching the crisis: Reflections on a feral pedagogy"

Richard Fadok, Rochester Institute of Technology

Summary: Richard Fadok discusses his experiences and experiments with teaching undergraduate students about the crisis of bird window collisions. He reflects on some of the opportunities and the challenges that arise in teaching about this topic. He breaks down the conceptualization of this educational approach as a feral pedagogy.

"The feral inscribed and anticipates loss, drawing on cultures of mourning and death, to incite our compassion - perhaps our action - for something that we are about to lose."
Feral Architecture, Ariana Lourie Harrison (2019)"

Q&A

Q: "Has the emotional heaviness and material of this course ever come up as a concern for the students involved? Is there any concern about the emotional impact and whether it's had any impact on participation or willingness to take on this curriculum?"

A: "I find that when given an outlet, that students are quite receptive and, in fact, desire the opportunity to talk about some of these issues that otherwise they might not have the ability to. I try to refrain as much as possible from just showing image after image of dead birds. I think that can be kind of depressing for many students. In our lab meetings for the initiative, I try to include space and time for reflecting on students' experiences of doing this work, which I know can be heavy. I think that as long as there is an outlet for having that conversation, it doesn't become too overwhelming. If anything, if it's coupled to design and the production of art, rather than being paralyzing it can actually be really empowering for students to see that the work they're doing can have tangible and real-world impacts on their local ecologies.

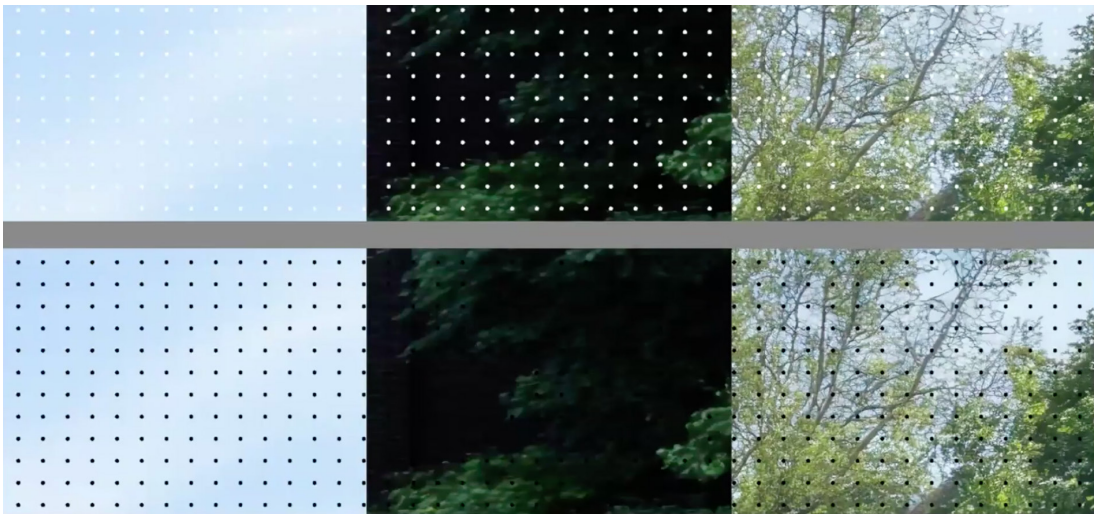
All of Richard's syllabi is publicly available on his personal website, www.richardfadok.com, along with flyers for the courses.

Space/Power/Species Course Flyer (Credit: Richard Fadok)

“One Size Does Not Fit All: What’s Important When Selecting Glass & Deterrents.”

Alex Sobolev, Guardian Glass

Summary: Alex Sobolev of Guardian Glass talks about the many factors to consider when choosing the best window collision deterrent product for a particular project.



How backdrop changes pattern observability. Credit: Alex Sobolev

There are four predominant testing methodologies that exist across the world right now: ABC's tunnel, Martin Rossler's tunnel in Europe, Professor Klem's field test, and monitoring. The interesting thing is, they don't always agree with each other. They can test the same material and get different results.

You can also have situations where two buildings use a very similar deterrent but one gets very few strikes, the other one gets a significant number of strikes. Birds are very visual creatures, so collision deterrent products have to signal that something is in their way so you must consider: background, foreground, and reflection. **Deterrents don't always work the same way, they don't show up the same way across different installations, or different environments, or different directions that an animal might be approaching the glass from.**

Also if the content of the reflection includes something that the birds really want to go to, that attractant can outweigh the deterrent. **The important categories in collision deterrents are pattern spacing, element size, the color, opacity, and material visual contrast, the surface position, and glass makeup**. Farther spaced apart, smaller sized, more opaque patterns tend to be less universally effective, as are pattern colors similar to the background they are blocking.

matte + blocks-light	glossy + blocks-light
matte + see-through	glossy + see-through

Table of options for dots in bird safe patterns. Credit: Alex Sobolev

Q&A

Q: "Do we have any progress with glass manufacturing for residential and single-family homes? If we could engage big glass manufacturers, what would be our ask of them?"

A: "One of the ways to maybe begin to convince them [residential glass manufacturers to start purchasing bird-friendly products] is to have a community of people who all order or guarantee a certain amount of bird-friendly orders. That would interest that type of business - but right now they're waiting for the demand to show itself."

Q: "For advocates who are maybe trying to get a building to put a retrofit in place, would it be appropriate for them to push back a little bit against this warranty claim [that collision deterrents will void a warranty]?"

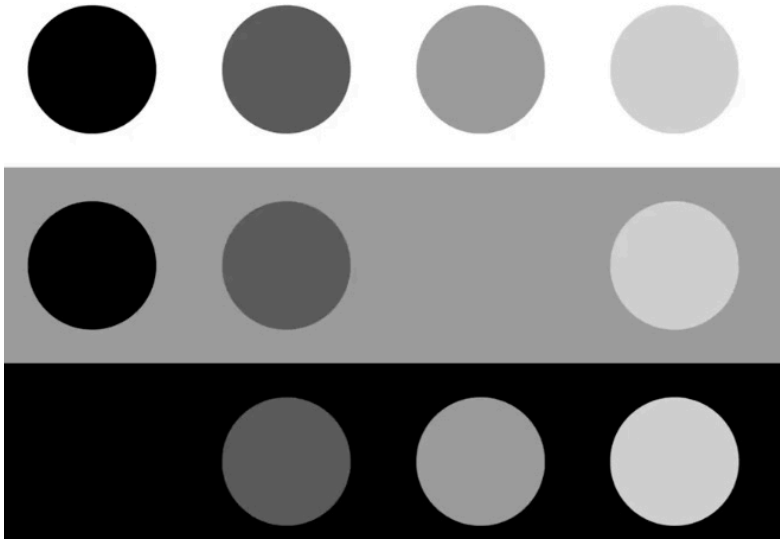
A: "I think so. At the very least, if you look at a city like New York, huge construction market, nearly every building gets full coverage film for advertisement purposes. At least, at the beginning 2 years of its life… So, people are either ignoring or just coming to terms with losing their warranty. I don't think they're getting hit by rejected warranty claims much at all."

Alex Sobolev Q&A Continued:
Discussion of UV Collision Deterrent Products

Q: "There's a little bit of hesitancy to recommend UV within the collision advocacy community, but some architects are unwilling to consider anything other than a UV option for aesthetic purposes. Is that okay? Should we be pushing for other options?"

A: [Sobolev] "Basically, any UV solution is not going to work as well as, let's say, a frit. But in the same sentence, I would say that the etch applied in a certain context is not going to work as a frit in the same context. **We're dealing with this gradient of performance that's really dependent on the pattern, the application building, the site-specific visual environment**. UV products are described very poorly by both the manufacturers that make them and oftentimes, the academics who evaluated them. It might say UV on the package, but there might be some other visual artifact that's causing the deterrence. It's hard to make blanket statements in the UV space, because everything is so different."

[Trudell] "There are a lot of products that claim to have UV as the active ingredient, but even if there's no UV detected in them or no UV detected as being reflected from them, they still work great because they're equivalent to a glob of hot glue on the surface - something that provides enough distortion of light. It's visible for reasons other than UV, and it is effective because of spacing.



How the color of a background can change the appearance and visibility of a color pattern. Credit: Alex Sobolev

“Industry, research and advocacy perspectives on collision deterrent marker spacing”

Heidi Trudell, Guardian Glass and Brendon Samuels, FLAP Canada

Summary: Heidi Trudell and Brendon Samuels co-presented a talk originally meant to be delivered by Paul Groleau, founder of Feather Friendly, who was unable to make the summit. Trudell and Samuels bring together perspectives from the research community, the advocacy community, and industry to talk about the gaps in between these markers, why that's really important, and some of the complexity that that entails for our work.

Collision deterrent marker spacing has been determined primarily through a testing method called "tunnel testing". There is a tunnel in Austria and the United States made for this testing. Others are more interested in the results of "field tests". There are two well-known methods for field testing marker spacing: Klem's field test, and then there's field surveys of buildings. However, tunnel testing or even field testing a product does not always confirm that is will work exactly the same in a different environment. Furthermore, three-dimensional deterrents in front of the glass don't have a consistent testing methodology. This makes it difficult for codes to outline standards for manufacturers of bird safe glass.

The production side is really challenged on what they are able to both manufacture, and offer as both standards or custom orders, because there's so many differences between North America and Europe in terms of testing and requirements. Even just within Canada and the U.S. municipalities, pattern spacing and sizing can be very different.

In order to justify standard patterns to manufacturers, there needs to be enough uniformity of recommendations, requirements, and demand within the industry to make it worthwhile. Money is a huge factor for manufacturers. Making versatile patterns can help save money. For example, when you manufacture a pattern that can be rotated 90 degrees, you might be able to get significantly higher yield from producing this pattern.

Q&A Continued

Q: "Is it true that putting collision deterrents that adhere to glass will void the warranty?"

A: [Trudell] "Only if it's full, full, full coverage. And that is a thermal stress thing, and usually that is a mirrored product that goes on the inside. The critical part with Surface One small dots, especially white, is they're actually reflecting heat, so that in no way should void the warranty on the basis of thermal stresses. Especially with the Acopian BirdSavers, which don't mess with the glass at all."

Q: "In the collision community, we've had some concerns come up about messaging and the nuance of promoting the 2x2 rule. We want to give all the information while balancing succinct messaging. Do you have any suggestions for how we can message our spacing recommendations where we are being succinct while getting the information across?"

A: [Samuels] "I think consensus is important.. I don't know that there is one singular answer, or one size fits all. I'd love to have a more detailed conversation about this with representatives, perhaps through the Alliance [BCPA] to figure out what is the right messaging that achieves that balance. I do think there's something to be said for providing flexibility. Architects are under a lot of pressure to balance a lot of competing priorities, and sometimes letting perfect be the enemy of good erodes confidence and trust that Bird Safe is a good investment for their projects. So, personally, I think 2x4 shows quite a lot of evidence of efficacy, and if we want to shift and strengthen it and say it has to be 2x2, we need to provide a good empirical basis for that."

[Trudell] We're also bumping into that with lighting versus glass, so by the time we're adding an extra layer of '2x4 is totally fine if it's front of the glass', eventually it turns into a broader understanding of this area for a broader audience."

[Sobolev] "Every material behaves differently. It has a different inherent contrast. That means that you might have one material where 2x4 is going to work fine because it has a natural higher contrast, or maybe its put in a context where it has a higher contrast. And that same material in a different location might not work. That's also going to change depending on the landscaping around the building, and the species you expect. One of the things that I try to do with our sales team is teach them to flag buildings that might be higher risk for lower efficacy products. If a building is in downtown New York, away from any parks, 2x4 might be acceptable. But if, for example, we're talking to a university that has an arboretum and a native pollinator garden next to a veterinary school, we might recommend 2x2 for this application.

Attendee Summary

- **7 countries represented**
  - United States (35 states)
  - Canada (5 regions)
  - Costa Rica (2 regions)
  - Austria
  - Germany
  - Netherlands
  - France

- **35 states of the United States represented**
  - Represented: Alaska, Arizona, Arkansas, California, Colorado, Connecticut, Delaware, Florida, Georgia, Idaho, Illinois, Indiana, Kentucky, Maine, Massachusetts, Michigan, Minnesota, Mississippi, Missouri, New Jersey, New Mexico, New York, Ohio, Oklahoma, Pennsylvania, South Carolina, Tennessee, Texas, Utah, Vermont, Virginia, Washington, West Virginia, Wisconsin (and Washington D.C.)

- **Industries represented**
  - Commercial Industry / Consulting (12)
  - Architecture / Lighting Design (5)
  - College / University (24)
  - Government (26)
  - Nonprofit (73)