PROPOSAL FOR LIGHTING REGULATIONS

Homeowners Association

Prepared by Soft Lights Foundation

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Contents

1. Excutive Summary

The switch to Light Emitting Diode (LED) technology has created a new set of risks to public health, safety, and civil rights and to the environment. As a result, homeowner assocations must update their policies, practices, and procedures to ensure the protection of the assocation members and the environment in which we live.

LEDs emit a directional beam of light which can be excessively intense, the spectral properties may contain excessive hazardous blue wavelength which is a known environmental carcinogen, and the light may contain digital flicker which is is a neurological hazard. One mechanism available to homeowner associations to protect member welfare is to publish and enforce strong lighting regulations. This document provides background information and a proposal for the Homeowners Association for lighting regulations.

2. Background

Figure 1 and Figure 2 show the difference between the nuisance glare of a blue-rich floodlight, and the soft glow of a low intensity, low color temperature porch light. Association lighting regulations will prevent the sitution in Figure 1 and permit the situation in Figure 2.

Figure 1 - Blue-rich Floodlight

Figure 2 - Soft Porch Light

3. Public Safety

The idea that artificial light provides universal safety and security is a deeply-entrenched myth, often leading to the excessive use of bright, blue-rich lighting that creates new hazards without deterring crime. In fact, numerous research studies have demonstrated repeatedly that artificial light providers neither safety nor security; therefore, any lighting regulations should not include a broad exception for "safety." (Appendix A).

A. Lack of Crime Deterrence

Contrary to common belief, studies frequently show that simply increasing illumination does not reduce crime and may even be associated with higher crime rates.

- **Vehicle Crime:** Research has found that streetlights may increase theft and that the absence of street lighting may prevent vehicle crime (March 30, 2022).
- **Chicago Analysis:** A study on streetlight outages in Chicago concluded that streetlights do not deter crime, finding that crime is more closely related to population and social factors. (2019).
- **UK Studies:** Major studies, including the Essex Police Crime and Lights Study and a 2015 UK study on reduced street lighting, concluded that streetlights reduce neither crime nor traffic accidents, and the Essex study found no decrease in crime from using lights. (2015 & 2017).
- **Vienna Analysis:** Research confirms that brighter lights increase crime rates. (2024).
- **World War II Blackouts:** Historical data from England showed that blackouts led to reduced crime during World War II (November 30, 2022).

B. Road Safety and Accidents

The switch to white-light LED street lamps has shown negligible impact on road safety and may introduce new visual hazards:

- **Leeds UK Relighting:** After changing nearly 80,000 lamps to white light, research found no evidence of any improvement in road safety or reduction in vehicle crashes. (2025 & 2023).
- **Visual Hazards:** Excessive brightness, especially from blue-rich LEDs, creates glare and compromises the vision of drivers and pedestrians, creating a potential wayfinding hazard rather than preventing one.

C. Focusing on Wayfinding and Comfort

Instead of relying on lighting for crime prevention, lighting regulations must focus on permitting a very limited level of lighting for wayfinding and discouraging glare.

- For pedestrians, a study found that there are diminishing returns in the "Feeling of Safety" as illumination increases, indicating that increasing illumination to high levels leads to smaller and smaller improvements in perceived safety (March 17, 2020).
- Soft, warm-colored lighting can contribute to perceived safety and comfort without the negative health and glare impacts of harsh white light, as studies confirm that women feel safer under soft lighting rather than harsh lighting (May 28, 2019).

By minimizing light levels, restricting harsh blue wavelengths, and focusing on careful wayfinding illumination only, the Association can achieve legitimate public safety goals without creating a public health or civil rights hazard.

4. Public Health

The most serious concern regarding modern artificial lighting, particularly blue-rich LED technology, is its profound and multi-faceted impact on public health. Unlike traditional lighting, high-intensity, short-wavelength (blue) light disrupts fundamental biological processes, rendering Artificial Light at Night (ALAN) a form of environmental pollution that must be minimized to the lowest possible levels. (Appendix B).

A. Circadian Disruption and Disease Risk

The human body's circadian rhythm—the natural 24-hour cycle—is primarily regulated by the protein melanopsin, which is highly sensitive to blue-wavelength light. Exposure to this light at night suppresses the production of the hormone melatonin.

- **Melatonin Suppression:** Blue-rich light is a potent melatonin suppressant, and this suppression is a critical link to disease. The American Medical Association recognizes that ALAN, by suppressing melatonin, is linked to a variety of adverse health outcomes (AMA Journal of Ethics, 2024).
- **Known Environmental Carcinogen:** The World Health Organization (WHO) and numerous studies identify blue-rich ALAN as a known environmental carcinogen (e.g., October 25, 2025; October 20, 2024; October 2, 2018). Increased ALAN exposure is specifically associated with higher risks of:
    - **Breast and Prostate Cancer** (October 25, 2025; October 2, 2018; December, 2010).
    - **Thyroid Cancer** (February 8, 2021; April 10, 2025).
- **Metabolic and Cardiovascular Harm:** Light exposure at night has been linked to severe cardiometabolic dysfunction. Studies show ALAN is a significant risk factor for developing:
    - **Cardiovascular Diseases** (October 23, 2025; June 20, 2025; February 21, 2021).
    - **Obesity and Diabetes** (June 22, 2022; July 15, 2022; December, 2022). Light exposure during sleep, even in tiny amounts, impairs cardiometabolic function (March 14, 2022).

B. Neurological and Psychological Effects

Beyond physical disease, ALAN directly affects neurological health and function.

- **Mental Health:** Increased exposure to light at night significantly increases a person's risk for psychiatric disorders such as anxiety, bipolar disorder, and PTSD (October 9, 2023;

August 10, 2022). Acute exposure to low-level light at night is sufficient to induce neurological changes and depressive-like behavior (November 29, 2019).

- **Cognitive Decline:** Outdoor light pollution has been linked with cognitive decline, Alzheimer's disease, and early-onset dementia (October 24, 2022; September 5, 2024; June 23, 2023).
- **Infant and Fetal Health:** Light pollution is an environmental stressor that has been linked to adverse infant health outcomes, including reduced birth weight and pre-term **births** (January 7, 2021; July 2018).

C. Mitigation via Low Color Temperature (CCT)

To protect public health, the ordinance must prioritize the immediate reduction of blue-wavelength exposure by restricting Correlated Color Temperature (CCT).

- High-CCT (white/blue-rich) lights are the most harmful. The proposed ordinance limits CCT to 2850K or less for all outdoor lighting, favoring warmer amber lighting.
- This approach is consistent with scientific consensus and acts as a necessary protective measure against the documented photobiological hazards of modern LED technology.

5. Ecology

Artificial Light at Night (ALAN) represents a form of widespread environmental pollution that is rapidly increasing across the globe, adversely impacting entire ecosystems. ALAN disrupts fundamental biological processes, including navigation, foraging, reproduction, and predator-prey dynamics, leading to significant declines in biodiversity. (Appendix C).

A. Disrupting Insect and Bird Behavior

Insects and birds, which provide crucial ecological services (pollination, pest control, food sources), are particularly vulnerable to light pollution.

- **Insects:** Many nocturnal insects are drawn to artificial light, a phenomenon that has devastating consequences. Artificial light causes insects to disorient and steer in circles until death (January 4, 2024), effectively creating "ecological traps." Studies on moths show that ALAN alters their flight behavior (November 13, 2024; October 8, 2024). Even red light, while less harmful than blue, can still have adverse ecological impacts (January 20, 2024).
- **Birds:** Blue-rich light is disastrous for many bird species (October 10, 2024). Light pollution interferes with the orientation and migration of birds, often causing them to become disoriented, collide with structures, or exhaust themselves.
- **Other Fauna:** The impact extends to other vital species. ALAN disrupts honey bee sleep rhythms (November 12, 2024) and has been shown to reduce earthworm surface activity by 76%, which is critical for soil health (January 19, 2024).

B. Impact on Ecosystem Dynamics

ALAN affects entire ecological systems by altering basic interactions between species and influencing plant life.

- **Predator Advantage:** Broad spectrum artificial light at night increases the conspicuousness of camouflaged prey (March 29, 2022), providing an unfair advantage to predators and shifting the balance of the ecosystem.
- **Marine Life:** ALAN severely impacts marine ecosystems, with studies showing it could cause a collapse in species or functional diversity by imposing selective pressures on reproductive and survival traits (October 30, 2023). Predatory marine species may strategically exploit high-light conditions (August 10, 2024).

- **Vegetation:** ALAN is a critical driver of vegetation dynamics, with findings demonstrating that it can outweigh temperature in lengthening urban growing seasons (June 16, 2025), disrupting natural cycles.

C. Mitigation Measures in the Ordinance

To protect the local ecology, the proposed ordinance enforces critical measures to minimize spectral emissions and light trespass:

1. **Color Temperature Restriction:** The strict limit on Correlated Color Temperature (CCT), favoring amber light (1800K – 2200K CCT), is crucial, as studies confirm that blue and white light pollution is particularly disastrous for species like birds.
2. **Light Containment:** Prohibiting light nuisance trespass and requiring that outside lighting be contained within the yard boundary directly reduces the exposure of surrounding natural areas and public spaces to harmful ALAN.
3. **Mandatory Curfew:** The requirement that commercial, governmental, and non-essential residential lighting be turned off when not in use or by a specific hour (e.g., street lighting by 10:00 PM) immediately reduces light pollution during the most critical nocturnal periods for wildlife.

6. Civil Rights

The Association's commitment to enacting and enforcing comprehensive outdoor lighting regulations is not merely a matter of aesthetic preference or nuisance control; it is a critical component of civil rights compliance under federal law.

Many individuals are light-sensitive and qualify for protection under the Federal Fair Housing Act (FHA) and state laws, such as the Michigan Persons with Disabilities Civil Rights Act (PDCRA). These laws mandate that the Association, as a housing provider, must ensure all residents have an equal opportunity to use and enjoy their dwelling and surrounding community.

A. Light-Sensitive Conditions as Disabilities

A wide range of neurological and medical conditions render individuals exceptionally sensitive to certain forms of outdoor lighting, and these conditions often qualify as disabilities under the FHA when they substantially limit a major life activity. These conditions include, but are not limited to:

- **Epilepsy and Seizure Disorders**
- **Autism Spectrum Disorder (ASD)**
- **Post-Traumatic Stress Disorder (PTSD)**
- **Migraines and Photophobia**
- **Traumatic Brain Injury (TBI)**

For these individuals, exposure to excessive light, high-luminance sources (like unshielded LEDs), or digital flicker can trigger severe symptoms such as seizures, debilitating migraines, panic attacks, nausea, or intense eye pain. When a neighbor's lighting causes such a reaction, it effectively denies the light-sensitive individual the equal opportunity to use and enjoy their property, constituting a direct violation of their civil rights.

B. The Requirement for Policy Modification: Reasonable Accommodation

The FHA requires a housing provider (the Association) to make reasonable accommodations in its rules, policies, practices, or services when such accommodations may be necessary to afford a person with a disability an equal opportunity to use and enjoy a dwelling.

The Association's adoption and enforcement of strict lighting regulations serve as this necessary policy modification by addressing the known threat posed by uncontrolled lighting:

1. **Abatement of Triggers at the Source:** The Association must modify its policies to prohibit and immediately abate any lighting—particularly excessive light trespass, glare, and blue-rich CCTs—that functions as a known medical trigger for a disabled resident.
2. **Addressing Light Nuisance as a Housing Barrier:** Because light trespass from an adjacent property directly interferes with the use and enjoyment of a dwelling, the Association is required to implement rules that strictly restrict light nuisance beyond property lines. This protects the essential right of a disabled resident to access and utilize their residence free from harmful stimuli.
3. **Controlling Hazardous Light:** The standards in the proposed regulations (e.g., maximum CCT of 2850K or less, fully shielded fixtures, and low intensity) are essential modifications necessary to protect the photobiological and neurological safety of disabled residents, thereby fulfilling the Association's FHA obligations.

By establishing strict lighting controls and enforcing them promptly, the Association ensures it is fulfilling its legal obligation to provide reasonable accommodation and uphold the civil rights of all residents, including those with light-sensitive disabilities.

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7. Lighting Regulations

The proposed lighting regulations prohibit light nuisance trespass beyond property lines, provides for photobiological and neurological safety from exposure to directly-viewed light, limits the use of blue wavelength light, and establishes a low-burden mechanism for enforcement.

Lighting Regulations

Artificial light that that is injurious to health, offensive to the senses, or an obstruction to the free use of property is deemed a nuisance.

Residential Lighting.

A. Standards.

(1) The light source shall not be directly-viewable from beyond the property line.

(2) Outside lighting shall be contained within the yard boundary. No light spillover shall occur outside the yard area.

(3) The Correlated Color Temperature (CCT) of the light shall not exceed 2850K.

(4) Outdoor lighting shall be turned off when not in direct use.

B. Guidelines.

(1) Amber lighting is preffered (1800K – 2200K CCT).

Holiday Lighting.

(1) Outdoor holiday lighting is permitted from December 1 through January 7.

(2) Outdoor holiday lighting shall not produce glare that interferes with the safe and equal access to, or use of, public spaces or pathways, including those individuals with neurological sensitivities.

(3) Outdoor flashing lights are prohibited.

(4) Outdoor holiday lighitng must be extinguished by 10:00pm.

Vehicle Lighting.

(1) Prohibited Use. The use of vehicle headlamps is not permitted when the vehicle is unattended and parked or when the vehicle is parked for an extended period in a manner that creates a nuisance.

(2) Exception. This section shall not apply to headlamps used solely for the purpose of emergency, maintenance, or repair of the vehicle, provided the vehicle is attended and the lighting is directed so as to minimize the creation of a nuisance.

Mobility Lighting.

(1) Mobility vehicles include bicycles, tricycles, wheelchairs, eBikes, scooters, golf carts, and similar transportation devices.

(2) The use of flashing lights on mobility devices is prohibited.

(3) The CCT for a light used on a mobibily vehicle shall not exceed 2850K.

APPENDIX A – CRIME AND SAFETY

June 20, 2025 – To Determine if Changing to White Light Street Lamps Reduces Crime: A Multilevel Longitudinal Analysis of Crime Occurrence during the Relighting of Leeds, a UK City – Switching to white light streets does not reduce vehicle crashes and has negligible impact on crime.

July 1, 2024 – Spatiotemporal Analysis of Nighttime Crimes in Vienna, Austria – This research confirms the results of other studies that brighter lights increase crime rates

March 1, 2024 – The Thorny Problem of Lighting and Crime – Fear of crime is real, but studies do not show that artificial outdoor lighting reduces crime or increases public safety.

June 5, 2023 – In the best light? Road safety and public spending – No evidence that there was any improvement in road safety in Leeds after nearly 80,000 lamps were changed to white light.

November 30, 2022 – Investigating Blackout Crime In The Second World War – Blackouts lead to reduced crime in England during World War II.

July 5, 2022 – To Determine if Changing to White Light Street Lamps Improves Road Safety – The conclusion is that white light does not improve road safety.

May 5, 2022 – Thief Cut Victim's Grass – The artificial light allowed a person to steal the homeowner's lawn mower and mow their lawn.

March 30, 2022 – Absence of Street Lighting May Prevent Vehicle Crime – Streetlights increase theft.

December 23, 2021– NYPD Police Cars Attacked – Proof that LED radiation devices likely increase agitation in people and do not reduce crime. If bright white LED lights shining onto NYPD police cars doesn't stop crime, then why have them?

March 17, 2020 – How Much Lighting is Required to Feel Safe When Walking Through the Streets at Night? – The observed improvement in the model fit, attributed to the logarithmic transformation of the illumination variable, indicates that there are diminishing Feeling of Safety returns, as increasing illumination to high levels leads to smaller and smaller improvements in Feeling of Safety.

2019 – Streetlight Outages, Public Safety, and Crime Displacement: Evidence from Chicago – Streetlights do not deter crime. Crime is a function of the population and the care shown by the city.

May 28, 2019 – More Lighting Alone does not Create Safer Cities – This study confirms that women feel safer under soft lighting rather than harsh lighting.

November 30, 2017 – Essex Police Crime and Lights Study – This Essex Police study showed no decrease in crime by using lights.

July 28, 2015 – The effect of reduced street lighting on crime and road traffic injuries at night – This UK study concludes that streetlights reduces neither crime nor traffic accidents.

2015 – Streetlights and how they relate to crime – This Rice University study found that streetlights do not reduce crime, and that areas with higher concentrations of streetlights had more crime.

2015 – Light and Crime – Royal Astronomical Society of Canada

March, 2007 – Halved Crime in a Dark City – Swedish Study

2005 – Conflicts of Interest – Let There be Light – An investigation into how researchers make tainted and false claims about the effects of street lighting on crime.

May, 2003 – Outdoor Lighting and Crime, Part 2: Coupled Growth – Australian Study

November, 2002 – Outdoor Lighting and Crime, Part 1: Little or No Benefit – Australian Study

December, 1997 – Dark Campus Programs – The standard myth is that lighting prevents crime, but by turning off the lights, school campuses have reduced vandalism.

February, 2000 – Vitamins Reduce Anti-social Behavior by 47% – Any city that wishes to reduce crime should invest in vitamin distribution, rather than artificial light.

April 24, 2019 – We are not including a link to a study from Crime Lab New York that claims that crime is reduced by using bright white lights. Their study used 600,000 lumen lights (equivalent to torture) running on diesel generators and there was a reduction of 1 crime over a 6 month period. We only mention this study because it is often quoted, even though it is complete nonsense.

APPENDIX B – HUMAN HEALTH

October 25, 2025 – Wavelength-resolved measures of outdoor artificial light at night and breast cancer risk – Outdoor artificial light at night (ALAN) may increase breast cancer risk by suppressing melatonin secretion, an effect influenced by light intensity and wavelength.

October 23, 2025 – Light Exposure at Night and Cardiovascular Disease Incidence – A study of 88,905 adults shows an increased risk of cardiovascular diseases due to brighter light at night.

July 28, 2025 – Association between outdoor artificial light at night, circadian health, and LDL-C in intracranial artery atherosclerotic stenosis – Increasing ALAN intensity surrounding residences was associated with poorer LDL-C control in ICAS patients, potentially mediated by circadian rhythm disruptions, global methylation levels, and ABC transporter protein expression.

June 20, 2025 – Personal night light exposure predicts incidence of cardiovascular diseases in >88,000 individuals – Night light exposure was a significant risk factor for developing cardiovascular diseases.

June 15, 2025 – Personal 24-hour light exposure pattern with obesity and adiposity-related parameters in school-aged children: A cross-sectional study based on compositional data analysis – Dim daylight and bright nightlight are linked with increased weight among boys.

April 10, 2025 – Perinatal Exposures to Ambient Fine Particulate Matter and Outdoor Artificial Light at Night and Risk of Pediatric Papillary Thyroid Cancer. Quote: "We evaluated the association between pediatric thyroid cancer risk and perinatal exposure to ambient fine particulate matter ($PM_{2.5}$) and outdoor artificial light at night (O-ALAN). **Both are considered environmental carcinogens** with evidence of thyroid function disruption, reported associations with thyroid cancer in adults, and concerns of distributive inequity."

February, 2025 – Beyond vision: effects of light on the circadian clock and mood-related behaviours – Impacts of light on the brain and circadian rhythms.

November 19, 2024 – The connections between human health and blue light pollution – Audio interview with Dr. Mario Motta, the father of the discoveries of blue light melatonin suppression and the connection to disease.

November 9, 2024 – Effects of near-infrared radiation in ambient lighting on cognitive performance, emotion, and heart rate variability – NIR is beneficial to human health.

October 20, 2024 – Indoor and outdoor artificial light-at-night (ALAN) and cancer risk: A systematic review and meta-analysis of multiple cancer sites and with a critical appraisal of exposure assessment – Artificial light at night increases cancer risk.

October 1, 2024 – Solid State Lighting: Review of Health Effects – A detailed literature of the health impacts of LED lighting by the International Energy Agency.

October, 2024 – We're all healthier under a starry sky – American Medical Association Journal of Ethics article by Dr. Mario Motta discusses the impacts of ALAN.

September 15, 2024 – Light pollution: time to consider testicular effects – Given the strong interrelationships between energy metabolism and fertility (Hansen et al., 2013; Della Torre et al., 2014; Roa and Tena-Sempere, 2014; Service et al., 2023), it is plausible that light pollution could impact fertility – impacts that include adverse effects on puberty from smart phone use at bedtime during adolescence.

September 5, 2024 – Outdoor nighttime light exposure (light pollution) is associated with Alzheimer's disease – Higher outdoor nighttime light was associated with higher prevalence of Alzheimer's Disease.

August 10, 2024 – Insights into the Effect of Light Pollution on Mental Health: Focus on Affective Disorders—A Narrative Review – Light pollution increases risk of mental health disorders including depression, bipolar disorder, and suicidal ideations.

April 8, 2024 – Why Are Cancer Rates in Young People Climbing? – Blue-rich lighting may be a culprit in the rise of cancers in the young.

April 5, 2024 – Melanopsin: Light response, circadian rhythm, and blue light exposure – An article on the light-detecting protein melanopsin and how it is found in the eye, fat, skin, blood vessels, and brain.

March 25, 2024 – Outdoor Light at Night, Air Pollution, and Risk of Cerebrovascular Disease: A Cohort Study in China – ALAN increases risk of disease.

February 20, 2024 – Light stimulation of mitochondria reduces blood glucose levels – Red light can reduce blood glucose spikes. Red light is generally beneficial, as compared to blue light which is the controller of our circadian rhythms, but also hazardous.

February 14, 2024 – Influence of Light at Night on Allergic Diseases: A Systematic Review and Meta-Analysis – Study finds that artificial light increases the risk of allergic diseases.

January 26, 2024 – Breast Cancer Incidence Among US Women Aged 20 to 49 Years by Race, Stage, and Hormone Receptor Status – Breast cancer rates started rising at 4% per year in correlation with the adoption of blue-right LED lights.

October 9, 2023 – Day and night light exposure are associated with psychiatric disorders: an objective light study in >85,000 people – Increased exposure to light at night increases a person's risk for psychiatric disorders such as anxiety, bipolar and PTSD severity as well as self-harm.

October 4, 2023 – Lights should support circadian rhythms: evidence-based scientific consensus – 2,697 peer-reviewed publications show the blue light is harmful.

August 21, 2023 – Induction of Skin Cancer by Long-Term Blue Light Irradiation – The results of this study showed that daily exposure to blue light for 1 year induced skin cancer.

June 23, 2023 – Outdoor artificial light at night and risk of early-onset dementia: A case-control study in the Modena population, Northern Italy – Study showing a connection between artificial light at night and dementia.

June, 2023 – Non-image-forming functional roles of OPN3, OPN4 and OPN5 photopigments – Proteins that can detect light.

May, 2023 – Understanding Light Pollution: Recent Advances on Its Health Threats and Regulations – Discussion of health impacts of light pollution.

March 17, 2023 – Light as a Modulator of Non-Image-Forming Brain Functions—Positive and Negative Impacts of Increasing Light Availability – Melanopsin-expressing ipRGCs mediate the influence of light on several circadian, neuroendocrine, and neurobehavioral functions collectively defined as NIF, i.e., functions not directly related to image formation.

March 16, 2023 – Light at night and cause-specific mortality risk in Mainland China: a nationwide observational study – The first study showing a direct correlation between artificial light at night and death. – Cellular risks of blue light exposure.

March 13, 2023 – The #1 EMF You've Forgotten About – Detailed blog discussion of the impacts of blue wavelength light on human health.

January 4, 2023 – Network-driven intracellular cAMP coordinates circadian rhythm in the suprachiasmatic nucleus – Circadian rhythms are controlled by blue wavelength light.

December, 2022 – Associations Between Indoor Light Pollution and Unhealthy Outcomes in 2,947 Adults: Cross-sectional Analysis in HEIJO-KYO Cohort – LAN levels are significantly associated with parameters of obesity, dyslipidemia, systemic inflammation, sleep disturbances, and depressive symptoms.

October 24, 2022 – Light Pollution Linked with Cognitive Decline – Outdoor light pollution study.

September 28, 2022 – Functional connectivity of brain networks with three monochromatic wavelengths: a pilot study using resting-state functional magnetic resonance imaging – Each wavelength has different impacts on human brain activity.

September 26, 2022 – Associations between indoor light pollution and unhealthy outcomes in 2,947 adults: Cross-sectional analysis in the HEIJO-KYO cohort – LAN levels are significantly associated with parameters of obesity, dyslipidemia, systemic inflammation, sleep disturbances, and depressive symptoms.

August 10, 2022 – Artificial light at night and risk of mental disorders: A systematic review – "the epidemiological evidence produced so far seems to support an association between LAN and risk of depressive disorders."

August 10, 2022 – Disruption of the Circadian Clock Drives Apc Loss of Heterozygosity to Accelerate Colorectal Cancer – Interruption of the circadian clock increases cancer risk.

July 15, 2022 – Outdoor light at night, overweight and obesity in school-aged children and adolescents – Outdoor light at night increases obesity in children.

June 22, 2022 – Light at Night in Older Age Associated with Obesity, Diabetes, and Hypertension – ALAN causes sickness.

June 14, 2022 – Linking Individual Differences Between in Human Primary Visual to Contrast Sensitivity Around the Visual Field – Research on how vision works.

June 6, 2022 – Risk of COPD Exacerbation is Increased by Poor Sleep Quality and Modified by Social Adversity – Poor sleep increases risk of lung disease.

March 14, 2022 – Light Exposure During Sleep Impairs Cardiometabolic Function – Blue light is bad. Any light is bad. Tiny amounts of light at night is bad.

March 10, 2022 – Outdoor Light at Night and Autism Spectrum Disorder – Artificial Light at Night significantly increases the risk of developing autism.

March 3, 2022 – The Mind After Midnight: Nocturnal Wakefulness, Behavioral Dysregulation, and Psychopathology – Maladaptive Behaviors After Midnight.

November, 2021 – One Third of Us are At Risk – Compiled links to medical research on the effects of LEDs.

June 6, 2021 – Afraid of the dark: Light acutely suppresses activity in the human amygdala – Fear of the dark is real.

May 13, 2021 – Should We Re-think Regulations and Standards for Lighting at Workplaces? A Practice Review on Existing Lighting Recommendations – Quote: the quality of light should not be reduced for lower energy consumption.

March, 2021 – Do no harm: the beginning of the age of healthy hospital lighting – Reduction of blue wavelength light improves sleep.

February 21, 2021 – The dark side of nocturnal light pollution. Outdoor light at night increases risk of coronary heart disease – Taken together, the present study by Sun *et al*. provides strong evidence that light at night may constitute a relevant contributor to increased risk of CHD.

February 8, 2021 – Associations between Artificial Light and Risk for Thyroid Cancer – Artificial light increases thyroid cancer risk by 55%.

February, 2021 – Insights into blue light accelerated tooth whitening – At a radiance of 190 mW/cm2, LEDs will bleach teeth.

January 27, 2021 – Moonstruck sleep: Synchronization of human sleep with the moon cycle under field conditions – Sleep timing is synchronized under the moon cycle. Artificial light disrupts this cycle.

January 7, 2021 – Light Pollution, Sleep Deprivation, and Infant Health at Birth – This study confirms that light pollution can lead to premature births.

November 5, 2020 – Evening home lighting adversely impacts the circadian system and sleep – This article makes the case that the economic benefits of energy efficient LED lighting are outweighed by the substantial disease burden they produce.

May 24, 2020 – 20% to 30% Have Heightened Sensitivity – This article articulates how the 20% to 30% of the population who are sensitive receptors have been so far snubbed by the the psychology profession.

February 29, 2020 – LED Street Lights – Major Health Concerns This presentation by Dr. Wojcik summarizes the research about the dangers of blue wavelength light.

February 27, 2020 – Blue Light Suppresses Melatonin in Dairy Calves This study shows that melatonin is suppressed by blue wavelength light, thus affecting eating, drinking, etc.\

2020 – Replace Toxic Fluorescent Light with Natural Light Now! – A discussion of research studies showing the adverse health impacts of fluorescent and LED light on health and student learning.

December 13, 2019 – Light-Emitting Diodes (LEDS): Implications for Safety – Even though this is an article from ICNIRP, it contains a fundamentally false statement on efficiency and is missing discussion of non-uniform luminance.

November 29, 2019 – Acute Exposure to Low Level Light at Night is Sufficient to Induce Neurological Changes and Depressive-like Behavior – Acute exposure to LAN alters brain physiology and can be detrimental to wellbeing in otherwise healthy individuals.

October 17, 2019 – Daily blue-light exposure shortens lifespan and causes brain neurodegeneration in Drosophila. – LED blue wavelength light causes serious injury to flies.

May 22, 2019 – Implication of Melanopsin and Trigeminal Neural Pathways in Blue Light Photosensitivity *in vivo* – Melanopsin is a protein that can detect light. The researchers demonstrate that blue-light exposure provokes important immune and inflammatory responses in the ocular surface, trigeminal pathways and the retina.

April, 2019 – Ocular hazards of curing light units used in dental practice – A systematic review – The article states, "This review concludes that blue light poses maximum risk to cause retinal degeneration based on the evaluated studies."

October 2, 2018 – Melatonin: An Anti-Tumor Agent This study shows that light at night increases risk of breast and prostate cancer.

September 9, 2018 – Blue light negatively affects the survival of ARPE19 cells through an action on their mitochondria and blunted by red light – Red light blunts the negative effects of blue light.

July 2018 – Light Pollution, Sleep Deprivation, and Infant Health at Birth – Skyglow results in reduced birth weight and pre-term births.

June 25, 2018 – Current Understanding of Photophobia, Visual Networks, and Headaches – How light triggers pain.

June 5, 2018 – SCHEER Final Opinion on Light Emitting Diodes – An overly positive opinion of LEDs, choosing to ignore the downsides and missing studies.

February, 2018 – Including an index measuring the weighted content of blue light in lamp labelling – A proposal for G-Index in place of Correlated Color Temperature.

August 8, 2017 – Harvard University – Outdoor Light at Night and Breast Cancer Incidence in the Nurses' Health Study II This study shows the link between artificial light at night and breast cancer.

February, 2017 – Blue Light Paradox – Blue wavelength controls circadian rhythms, but also damages the eye.

January 31, 2017 – National Institutes of Health – Timing of Light Exposure Affects Mood and Brain Circuits – This scientific research article covers how circadian rhythms are being disrupted by artificial light at night.

January 2017 – Photobiological Safety – Discussion of the impacts of LED light on circadian rhythms and eye cells by Christophe Martinsons.

April, 2016 – Exposure of Fluid Milk to LED Light – LED light has a strong negative impact on the taste of milk.

January 24, 2016 – NIH – Effects of Blue Light on the Circadian System and Eye Physiology This scientific research paper concludes that blue light causes photoreceptor damage.

November 17, 2014 – Melanopsin mediates light-dependent relaxation in blood vessels – Melanopsin proteins are found in blood vessels and can detect light.

January 2013 – Health Effects of Large LED Screens on Local Residents – Luminance above 10,000 nits is dangerous and this article mentions the need to further study the impacts of LEDs on those with epilepsy.

November 8, 2012 – Ensuring Safety in LED Lighting – Significant coverage of the dangers of LED radiation. Blue light hazard, excessive luminance, macular degeneration, sleep disruption, and LEDs classified as lasers for use in toys.

June 3, 2011 – Limiting the impact of light pollution on human health, environment, and stellar visibility. – Impacts of light pollution.

December, 2010 – Light Pollution: Light at Night and Breast Cancer Risk Worldwide This study shows that cancer risk increased by as high as 50% for countries with high Artificial Light at Night.

August 20, 1999 – Daylighting in Schools Study – Students perform better under natural light.

November 22, 1996 – Effect of bright light exposure on muscle sympathetic nerve activity in human – 5000 lux light triggers nerve activity, even after the light is shut off.

APPENDIX C – ECOLOGY

June 24, 2025 – Policy Brief: Restoring the Night: A Policy Agenda for Light Pollution Mitigation in Europe – This policy brief provides strategic guidance for the European Union to take steps towards addressing light pollution, recognising its adverse environmental impacts, harmonising efforts and providing a framework for coordinated national action, as well as promoting science-based regulation and management of artificial light at night (ALAN).

June 16, 2025 – Citizen science illuminates the nature of city lights – Counting and categorizing all outdoor lighting sources in a city.

June 16, 2025 – Artificial light at night outweighs temperature in lengthening urban growing seasons – Findings demonstrate that ALAN is a critical driver of vegetation dynamics in cities, one we should consider during urban management and development.

November 13, 2024 – Pulsed artificial light at night alters moth flight behaviour – LED vehicle headlights impacting moth behavior.

November 12, 2024 – Exposure to constant artificial light alters honey bee sleep rhythms and disrupts sleep – Bees are adversely impacted by artificial light at night.

October 10, 2024 – Blue and white light pollution is disastrous for Cory's shearwater fledglings – Birds are severely impacted by blue-rich light.

August 10, 2024 – Maltese Coastline Never Sleeps: The Effects of Artificial Light at Night (ALAN) on the Local Infralittoral Assemblages—A Case Study – Predatory species, particularly *T. trachurus*, strategically exploited high-light conditions, demonstrating station holding behaviour, primarily under high-intensity white light, due to net energy gain despite increased metabolic costs.

October 8, 2024 – Shedding light with harmonic radar: Unveiling the hidden impacts of streetlights on moth flight behavior – Impacts of streetlights on moths.

July 26, 2024 – How to reduce the negative impacts of artificial light at night on flying insects – Reduced light levels and homogeneity of coverage reduces adverse insect impacts.

January 20, 2024 – Research Note: Red light to mitigate light pollution: Is it possible to balance functionality and ecological impact? – Even red light at night can have adverse ecological impacts.

January 19, 2024 – Artificial light at night reduces earthworm activity but increases growth of invasive ragweed – Light pollution reduced earthworm surface activity by 76% and increased ragweed height growth by 104%.

January 11, 2024 – How Artificial Light Threatens Nature – Video documentary that details how artificial light is devastating the ecosystem.

January 4, 2024 – Why flying insects gather at artificial light – Insects turn their dorsum towards the lights which provides orientation. Artificial light causes the insects to steer in a circle until death.

October 30, 2023 – The impacts of artificial light at night on the ecology of temperate and tropical reefs – ALAN could cause a collapse in species or functional diversity, by imposing selective pressures on species traits that limit fitness consequences for reproduction, recruitment and survival under ALAN conditions.

October 30, 2023 – Light Pollution in Complex Ecological Systems – Light pollution is increasing at 10% per year and adversely impacting entire ecosystems.

September 21, 2023 – Phenotypic signatures of urbanization? Resident, but not migratory, songbird eye size varies with urban-associated light pollution levels – The eye size of urban birds is shrinking.

September 19, 2023 – Healing with the Night: Investigations into Experiences of Natural Darkness in Overnight Recollective Practices – The healing properties of natural night.

September 14, 2022 – Environmental risks from artificial nighttime lighting widespread and increasing across Europe – LEDs have increased light pollution and have increased the emissions of toxic blue wavelength light.

September 9, 2022 – The Dark Side of LEDs: Suppression of Melatonin by Blue Light – An article about the studies of researcher

June 14, 2022 – Impacts of artificial light at night in marine ecosystems—A review – Impacts of ALAN on fish.

May 20, 2022 – Light pollution can disorient monarch butterflies – Even a single light can interfere with a butterfly's navigation system.

March 29, 2022 – Broad spectrum artificial light at night increases the conspicuousness of camouflaged prey – LED light leads to predator advantage.

April 27, 2022 – Oriented Migratory Flight at Night: Consequences of nighttime light pollution for monarch butterflies – ALAN interferes with monarch butterfly migration.

January 27, 2022 – The growing threat of light pollution to ground-based observatories – Impacts of skyglow on dark skies.

2022 – Artificial Light at Night: State of the Science 2022 – IDA report. Discusses how LED light is increasing light pollution. Falsely claims that LEDs are energy efficient.

August, 2021 – Street lighting has detrimental impacts on local insect populations – This study shows that LEDs are killing insects even faster than High Pressure Sodium.

August, 2021 – First Estimation of Global Trends in Nocturnal Power Emissions Reveals Acceleration of Light Pollution – Light pollution continues to grow and LED blue wavelength light is making it worse.

June 9, 2021 – Long-term exposure to artificial light at night in the wild decreases survival and growth of a coral reef fish – Our study provides the first evidence that long-term exposure to ALAN pollution, over 18–23 months, negatively impacts the survival and growth of a wild coral reef fish.

April, 2021 – Narrow Spectrum Artificial Light Silences Fireflies – Artificial light, especially bright amber, suppresses courtship. "we should focus on minimizing the time that lights are on and how bright they are." – News Story

March, 2021 – Light Pollution Drives Increased Risk of West Nile Virus – Even low levels of artificial light at night increase the risk of transmission of the virus.

March, 2021 – Superoxide is Promoted by Sucrose and Affects Amplitude of Circadian Rhythms in the Evening – Both light and sugars affect the biological clock of plants. – News Story

March 10, 2020 – Artificial Lighting Impacts to Salmon in WRIA 8 Briefing Memo – Artificial light is impacting the survival of juvenile salmon.

January, 2020 – Australian Light Pollution Guidelines for Wildlife This detailed document describes best lighting practices.

2020 – "use lamps with the lowest CCT, melanopic response, or M/P value possible to achieve the goals of the lighting project." – Illuminating Engineering Society – On the Use of Summary Metrics of Light Spectral Characteristics to Assess Effects of Artificial Light at Night on Wildlife

2020 – "ALAN reduces habitat suitability" – El Sevier – Effects of artificial light at night on the foraging behavior of an endangered nocturnal mammal

July 30, 2018 – Waters under Artificial Lights: Does Light Pollution Matter for Aquatic Primary Producers? – ALAN and LED light negatively impacts periphyton.

July 30, 2018 – Waters under Artificial Lights: Does Light Pollution Matter for Aquatic Primary Producers? – ALAN negatively impacts periphyton.

2018 – "Anthropogenic lighting drastically alters nocturnal environments, threatening a wide range of species" – Colorado State University – Anthropogenic light disrupts natural light cycles in critical conservation areas

2018 – "we advocate warm color temperature white light as nighttime illumination" – Health and Human Services USA – Light at night disrupts nocturnal rest and elevates glucocorticoids at cool color temperatures

2018 – "bombarded with numerous novel stimuli in their environment that could lead to grave consequences." – Journal of Ecology – Connecting spectral radiometry of anthropogenic light sources to the visual ecology of organisms

2018 – "if the tendency to light more when light is cheaper can be overcome" – Luger Research – Hazard or Hope? LEDs and Wildlife

2017 – "When the installation was illuminated, birds aggregated in high densities, decreased flight speeds, followed circular flight paths, and vocalized frequently" – Proceedings of the National Academy of Sciences – High-intensity urban light installation dramatically alters nocturnal bird migration

2013 – "alters detection of day and night" – Exeter University – Measuring biological light pollution and uncovering its ecological effects

2013 – "the significant impact that even low levels of nighttime light pollution can have" – Cambridge University – The ecological impacts of nighttime light pollution: a mechanistic appraisal

November, 2017 – Artificially lit surface of Earth at night increasing in radiance and extent – This study uses satellite data to show that light pollution has increased due to the use of LED lights.

2017 – "Managers should avoid lights that have ultraviolet or blue light (shorter wavelengths)" – National Park Service – Artificial Night Lighting and Protected Lands

April, 2015 – Artificial Light at Night and the Predator-Prey Dynamics of Juvenile Atlantic Salmon – Even tiny amounts of artificial light affect salmon.

2015 – "The most immediate threat from anthropogenic noise and light is the loss of species" – Trends in Ecology & Evolution – A framework to assess evolutionary responses to anthropogenic light and sound

May 29, 2014 – Potential Biological and Ecological Effects of Flickering Artificial Light – Explains how the visual system of different creatures have a rate at which they capture images. Electric light interferes with this system, causing perceived flicker.

2014 – "exacerbate existing domestic, e.g., midge swarms and industrial infestations of sanitary and phytosanitary pests" – Ecological Society of America – LED lighting increases the ecological impact of light pollution irrespective of color temperature

2012 – "Technological innovations and changes in lighting strategies should consider benefits for reductions in greenhouse gases and energy consumption in parallel with their potential ecological impacts" – Global Change Biology – Conserving energy at a cost to biodiversity? Impacts of LED lighting on bats

2009 – "Light pollution can have significant conservation consequences for a threatened bat species" – Current Biology – Street Lighting Disturbs Commuting Bats

APPENDIX D – CIVIL RIGHTS

Americans with Disabilities Act

42 U.S. Code § 12132 – Discrimination - Subject to the provisions of this subchapter, no qualified individual with a disability shall, by reason of such disability, be excluded from participation in or be denied the benefits of the services, programs, or activities of a public entity, or be subjected to discrimination by any such entity.

§ 35.151(b)(1) - Alterations - Each facility or part of a facility altered by, on behalf of, or for the use of a public entity in a manner that affects or could affect the usability of the facility or part of the facility shall, to the maximum extent feasible, be altered in such manner that the altered portion of the facility is readily accessible to and usable by individuals with disabilities, if the alteration was commenced after January 26, 1992.

28 C.F.R. 35.130(b)(7)(i) – Reasonable Modifications - A public entity shall make reasonable modifications in policies, practices, or procedures when the modifications are necessary to avoid discrimination on the basis of disability, unless the public entity can demonstrate that making the modifications would fundamentally alter the nature of the service, program, or activity."

28 C.F.R. 35.130(d) – Most Integrated Setting - A public entity shall administer services, programs, and activities in the most integrated setting appropriate to the needs of qualified individuals with disabilities.

28 C.F.R. § 35.160 – Flashing Light Communication - A public entity shall take appropriate steps to ensure that communications with applicants, participants, members of the public, and companions with disabilities are as effective as communications with others.