



Arkansas Natural Sky Association

The Night - Natural, Beautiful, Healthy & Free



Light Pollution: What's The Harm?

- Besides hiding the stars, Light Pollution:
 - Wastes money and energy
 - Contributes to air pollution and green house gases (100 Watt bulb = <.5 ton of CO₂)
 - Alters the diurnal cycle impacting:
 - animal, plant and human health
 - Can contribute to crime and accidents
 - Creates nuisance and light trespass
- There literally is nothing good about Light Pollution

Light Knows No Boundary



Lights at Night: Video from International Space Station, February 2012

IDA in Partnership with NOAO, NSF and IYA
Dark Skies Awareness



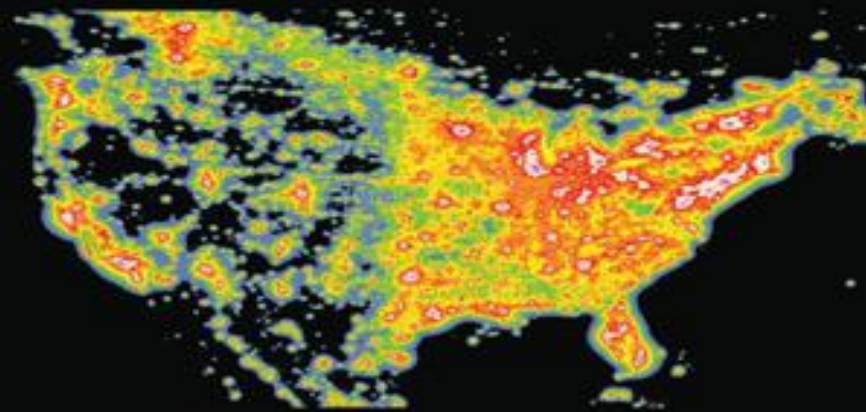
Late 1950s



Mid 1970s

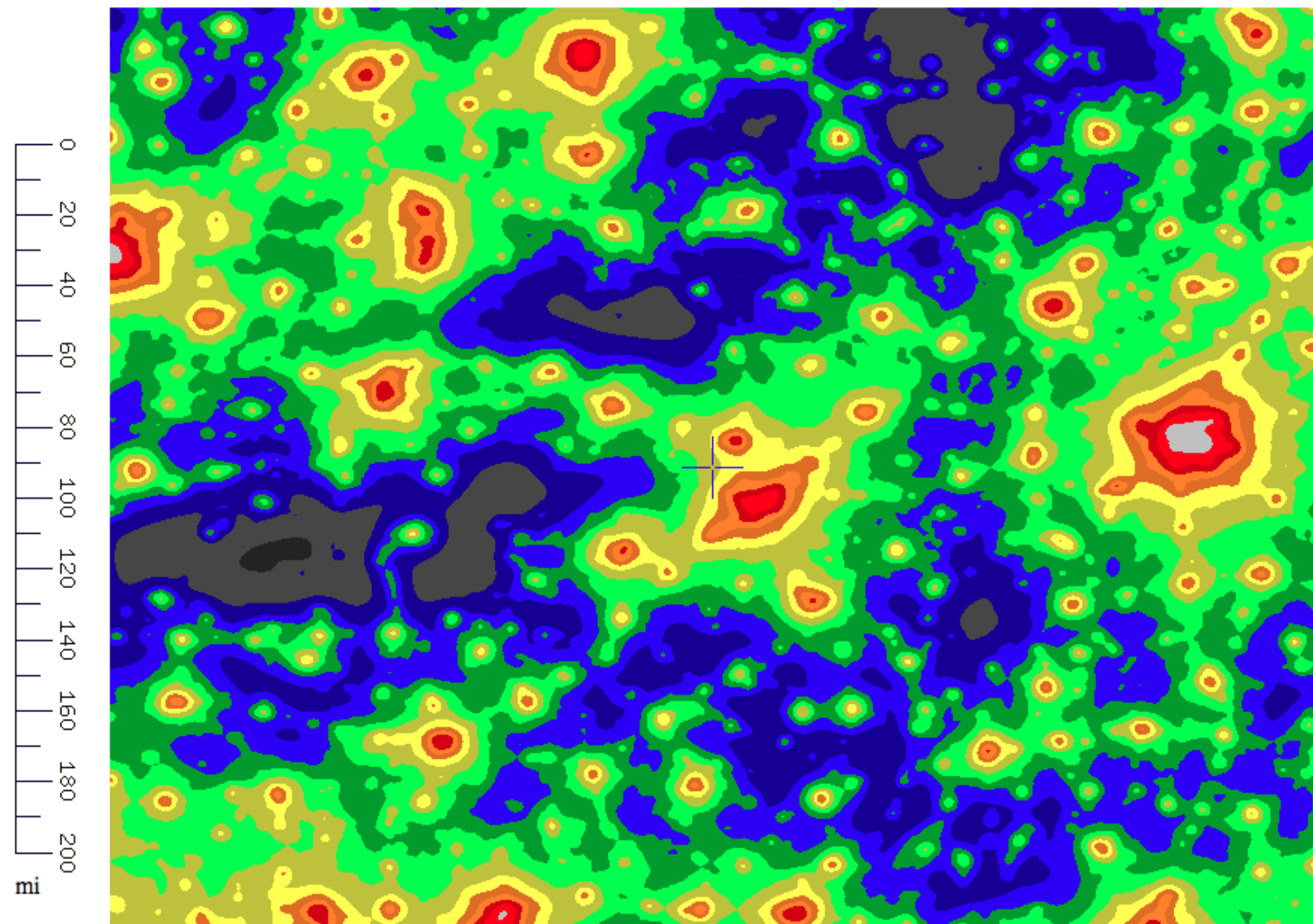


1997



2025





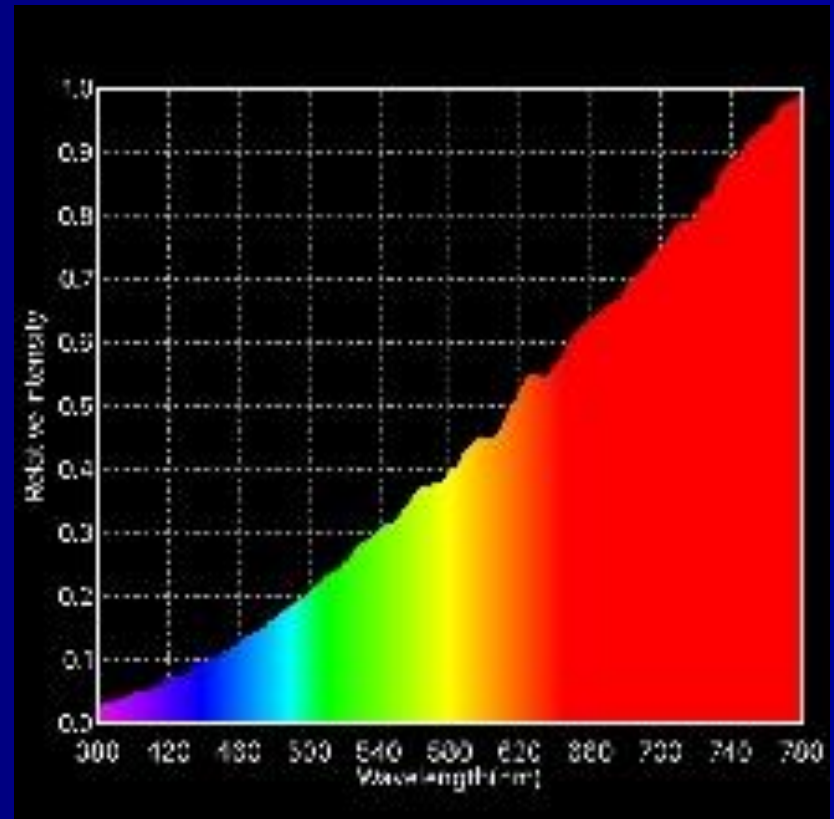
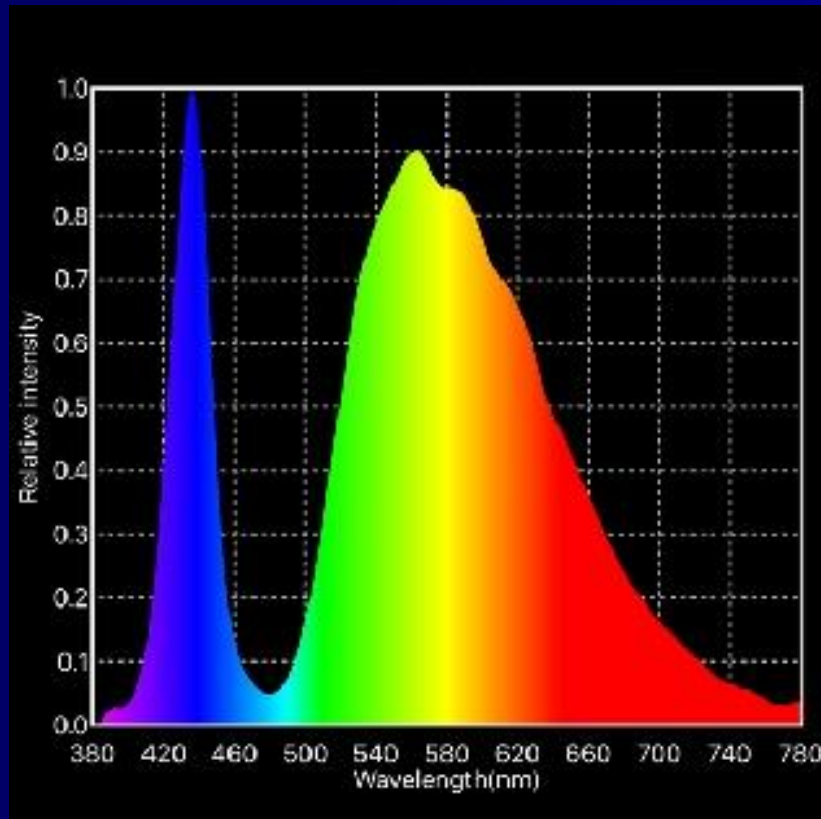
Human Health - 2009



American Medical Association 2009:

- Light at night “. . . disrupts human and animal circadian rhythms . . .”
- Risks: diabetes, depression, obesity and cancers – breast and prostate.
- Disability (blinding): Glare is a safety hazard
- “Advocates” future outdoor lighting be “energy efficient” and “fully shielded!”

Using the Proper Color: Avoid Blue Light



Blue Light Warning – 2016



- 2016 AMA highlights the risk of blue light content of LED fixtures. Recommends avoiding:
 - fixtures with high blue content
 - unshielded fixtures
 - over-lighting
- “Here’s To Your Health” by UAMS
- Check your iphone computer apps

The Health Mechanism

How exposure to **blue light** affects your brain and body

BY DISRUPTING MELATONIN, **SMARTPHONE LIGHT** RUINS SLEEP SCHEDULES. THIS LEADS TO ALL KINDS OF **HEALTH PROBLEMS**:

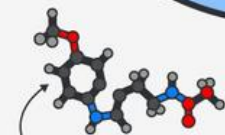
The disruption to your sleep schedule might leave you distracted and impair your **MEMORY** the next day.



A poor night's sleep caused by smartphone light can make it **HARDER TO LEARN**.



Over the long term, not getting enough sleep can lead to **NEUROTOXIN** buildup that makes it even harder for you to get good sleep.

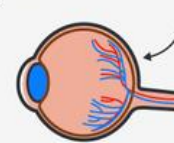


People whose melatonin levels are suppressed and whose body clocks are thrown off by light exposure are more prone to **DEPRESSION**.



By disrupting melatonin and sleep, smartphone light can also mess with the hormones that control hunger, potentially increasing **OBESITY RISK**.

There's some evidence that blue light could damage our vision by harming the **RETINA** over time — though more research is needed.



Researchers are investigating whether or not blue light could lead to **CATARACTS**.



There's a connection between light exposure at night and the disturbed sleep that come with it and an increased risk of breast and prostate **CANCERS**.



SOURCES: Nature Neuroscience; Harvard Health Publications; ACS, Sleep Med Rev, American Macular Degeneration Foundation; European Society of Cataract and Refractive Surgeons; JAMA Neurology

TECH INSIDER

Unsafe Lighting: Disability Glare



Disability glare = light that blinds rather than illuminates



Photos © George Fleenor

Good visibility is the goal



© International Dark-Sky Association



Another Encroachment on Natural Habitat

- Navigational impacts – sea turtles, migratory birds and some insects
- Alters predator prey balance for nocturnal species
- Interferes with mating, growth, and maturation
- Shrinks habitat



The Solution:

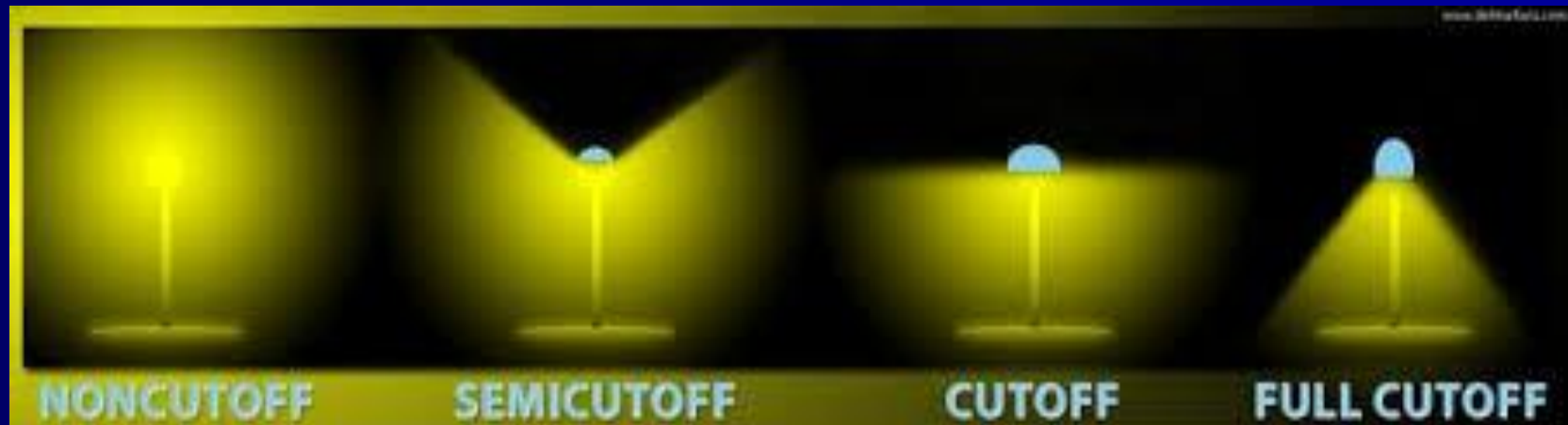
Responsible Lighting Principles

- Only light where needed (which means using efficient fully shielded properly aimed fixtures).
- Only light when needed (use curfews, motion sensors, timers and switches etc.)
- Avoid over lighting.
- Use appropriate color light for the purpose.

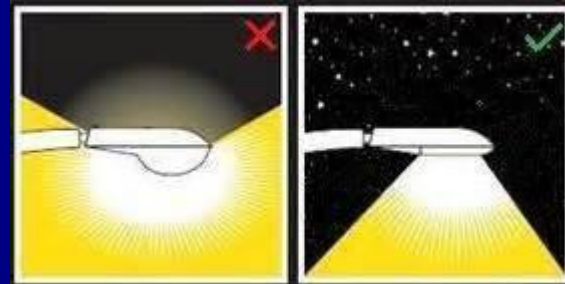
Irresponsible Lighting Sources

- Improperly Aimed and Shielded Fixtures.
- Over Lighting (which is poor lighting).
- Unmonitored dusk to dawn lighting.
- Failure to use timers & sensors.
- Vanity “look at me” Lighting.
- Marketing “look at me” lighting.

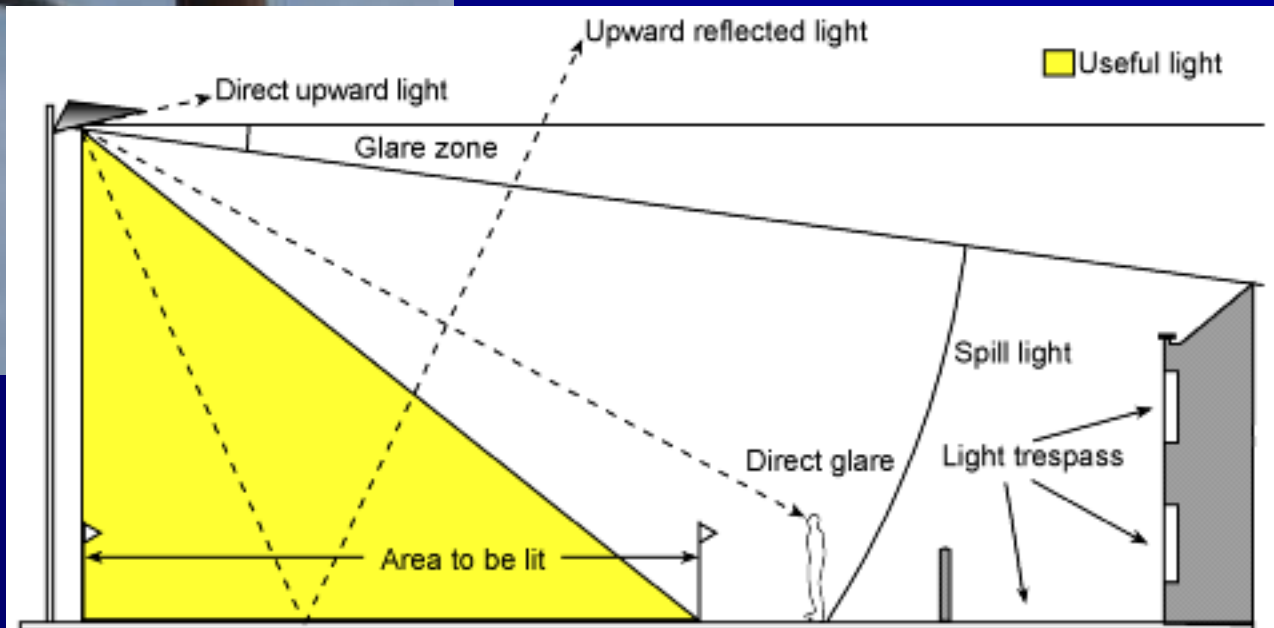
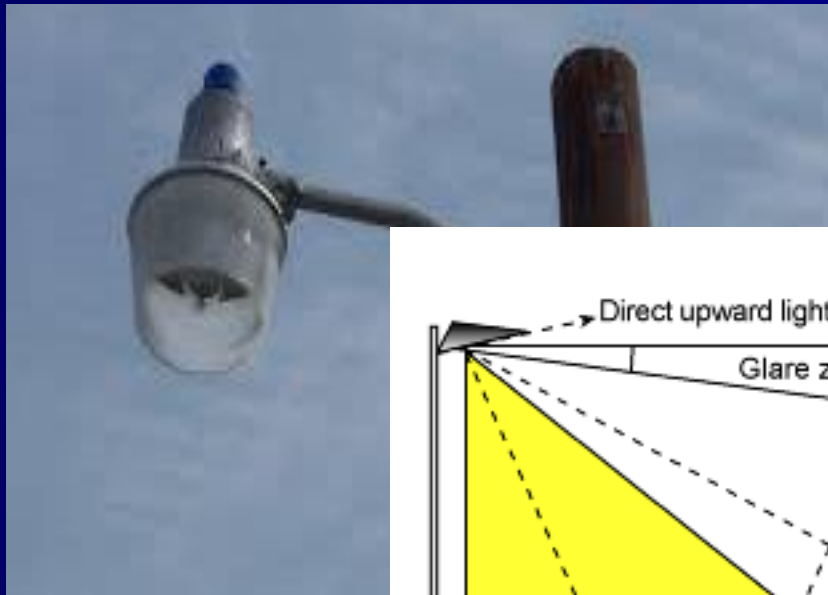
Shielding - Avoiding Waste, Up-light, Glare & Trespass



Notice Highway lighting
Subject to Fed funding
Changing styles

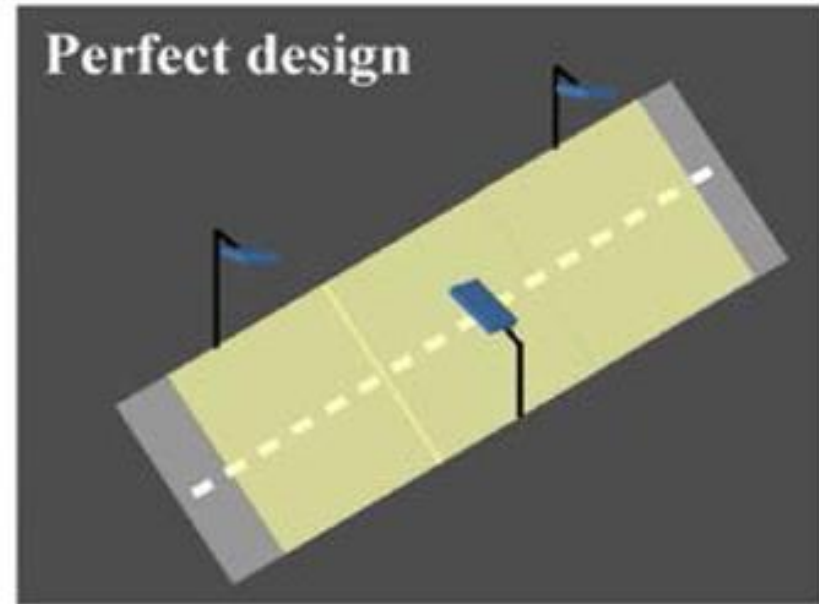
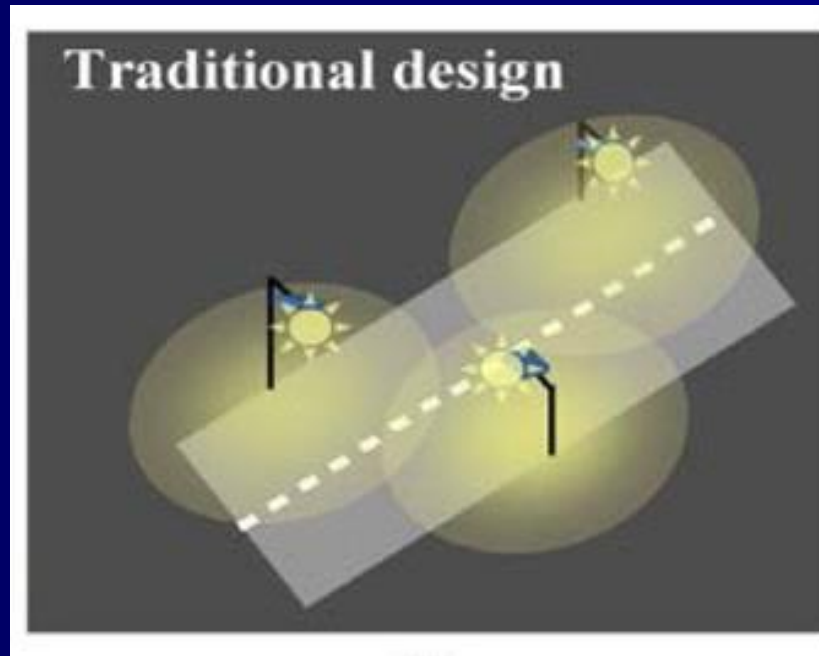


Where Needed: Ban the Barn Yard Light



Light pollution is often caused by the way light is emitted from lighting equipment. Choosing proper equipment and carefully mounting and aiming it can make a significant difference.

LED light can be targeted



Vanity Lighting – A garish display of Oblivious Hubris.



When & where Needed - Light & Crime: The Cockroach Theory

Safety Quiz (True or False)

1. Night lighting has been proven to reduce crime.

FALSE

2. Most property crimes occur at night. *

FALSE

3. Lighting can actually attract criminals. *

TRUE

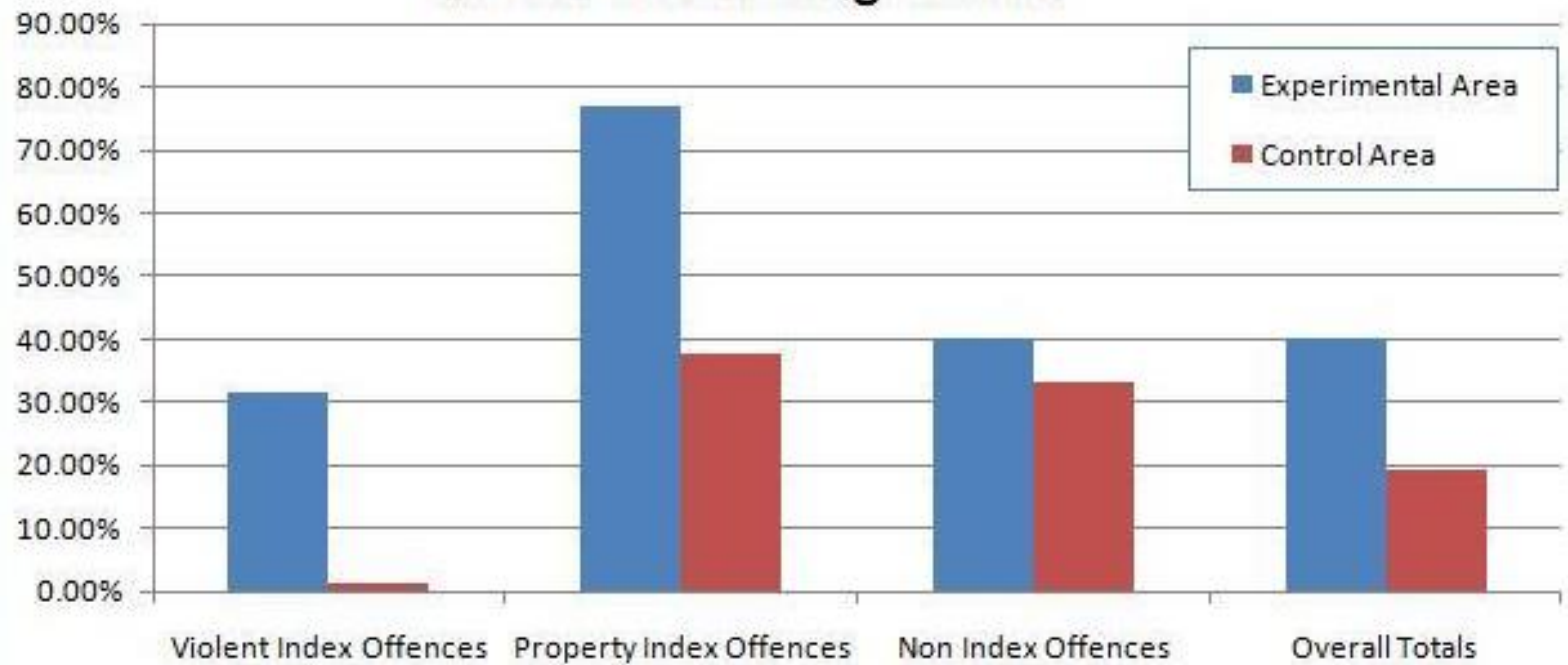
* National Institute of Justice study (1997)

"We can have very little confidence that improved lighting prevents crime, particularly since we do not know if offenders use lighting to their advantage."

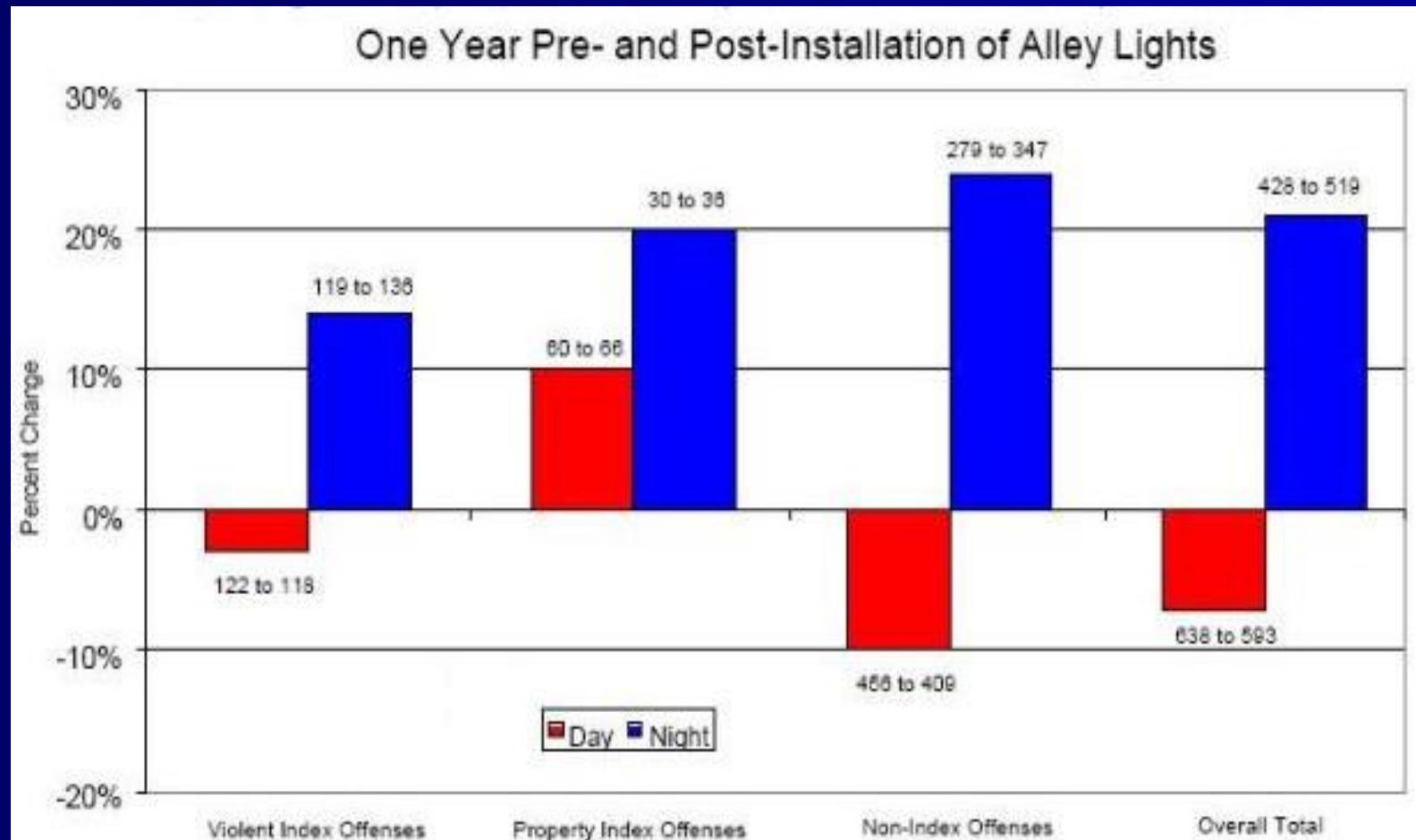


Chicago Alley Study

**Percentage Increases of Crimes
from Before Lighting Installation to After
for the Two Chicago Areas**



Chicago Alley Study



Hillcrest Daylight Raid



Porch Must Be Too Dark



Leaving the Light on and door open, makes it easy.



Static Light - Criminal's Friend

Dynamic Light - Your Friend



Don't Fall For a False Sense of Security

Lighting is more likely to enhance security when:

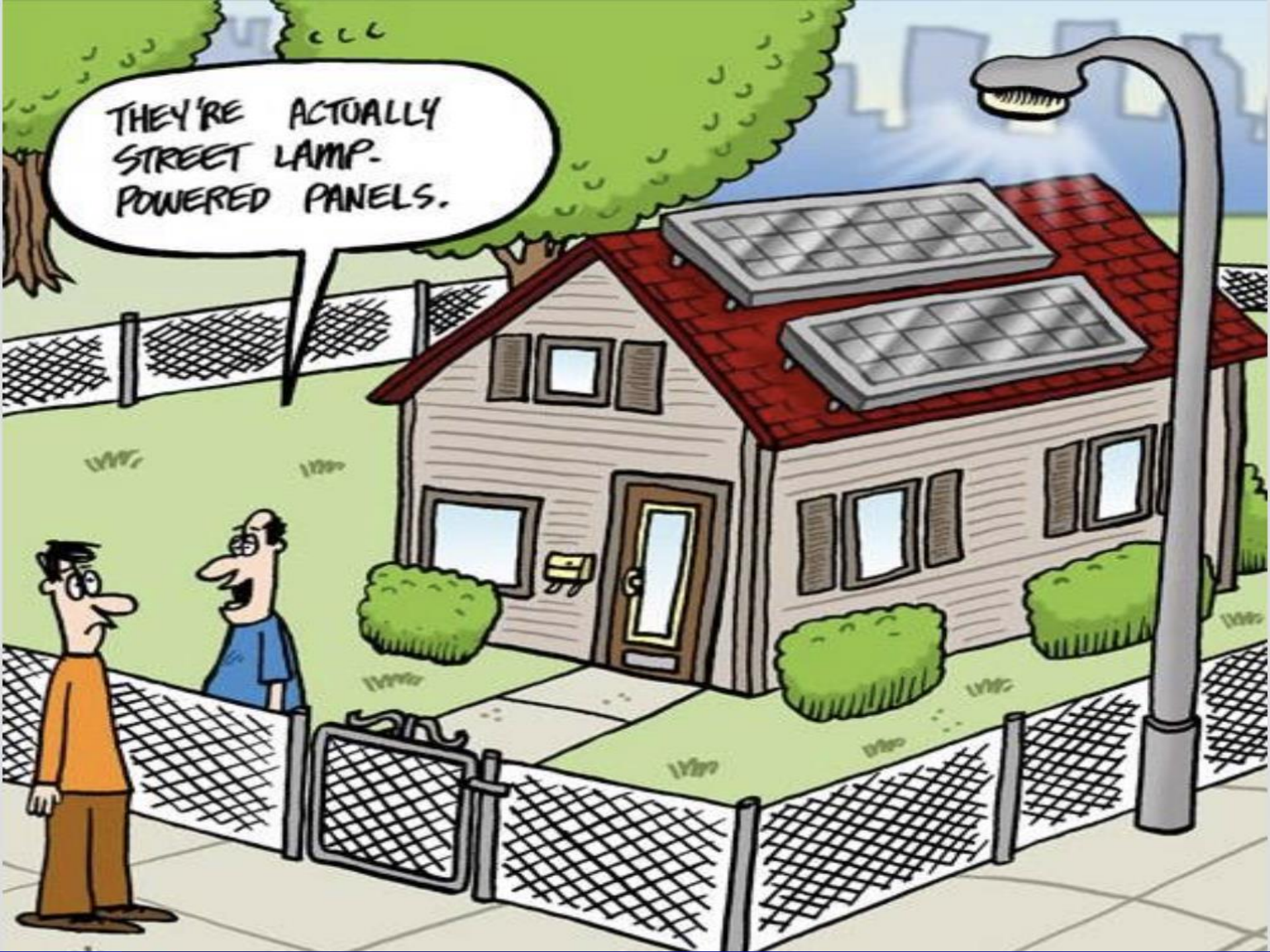
- When someone is actually available to witness what is being illuminated – Just lighting some part of the world is not useful.
- When on a motion sensor.

Action Items:

- Put exterior fixtures on motion sensors
- Install actual security systems.



THEY'RE ACTUALLY
STREET LAMP.
POWERED PANELS.



Over Lighting: Utility Company “Security Lighting”

530 Lux vs. 30 Lux recommended!

Notice the darkness past the tree.

All the units have their blinds closed tight.

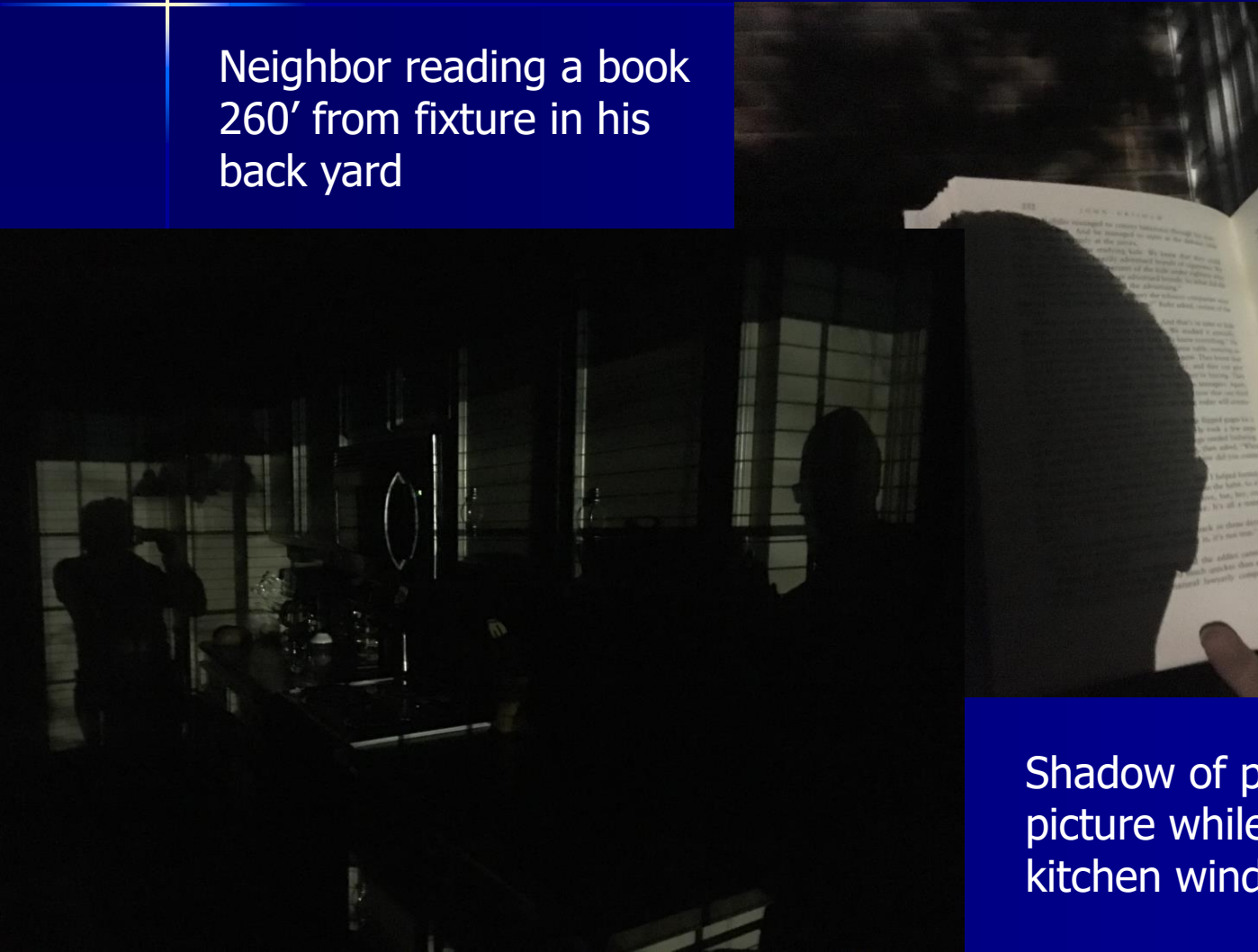
Notice shadows.

Notice light in the trees.



Light Trespass!

Neighbor reading a book
260' from fixture in his
back yard



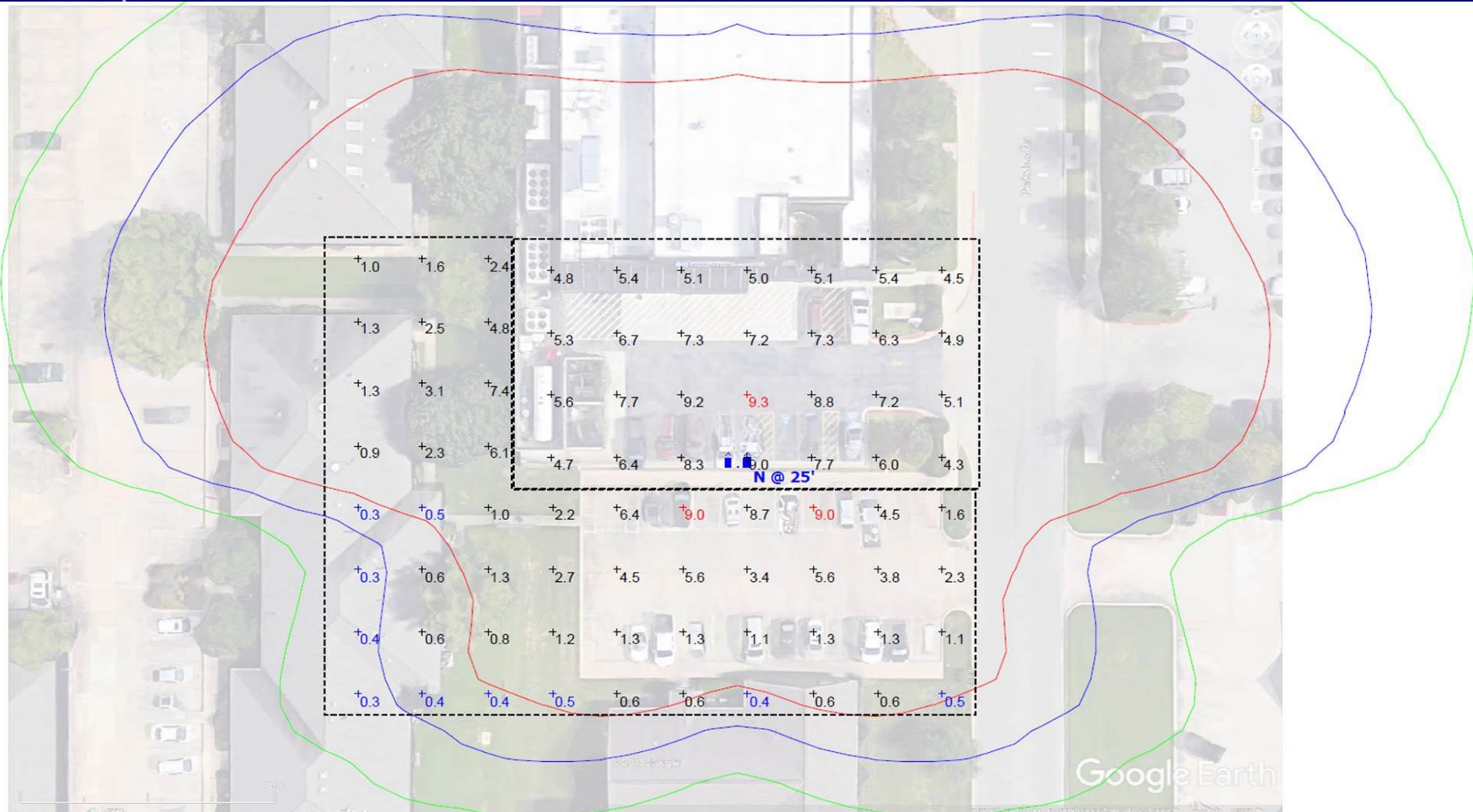
Shadow of person taking this
picture while standing in the
kitchen window.

Over-Lighting/Marketing

Are we
attracting
moths, or
providing
necessary
illumination?

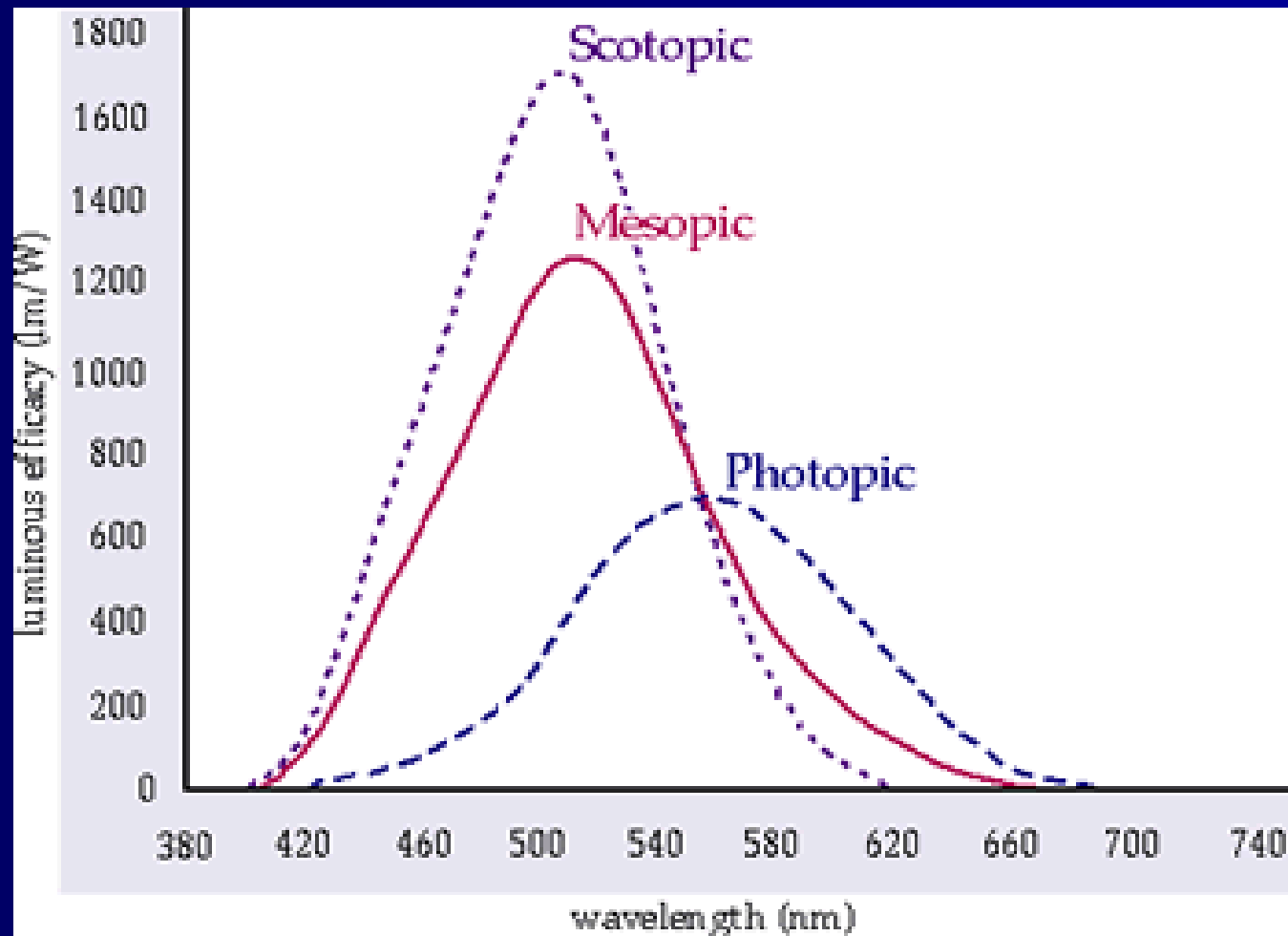


Today Lighting Can Be Designed.



Proper color

Not All Lumens Are Created Equal



8,040 vs 19,000 Lumens



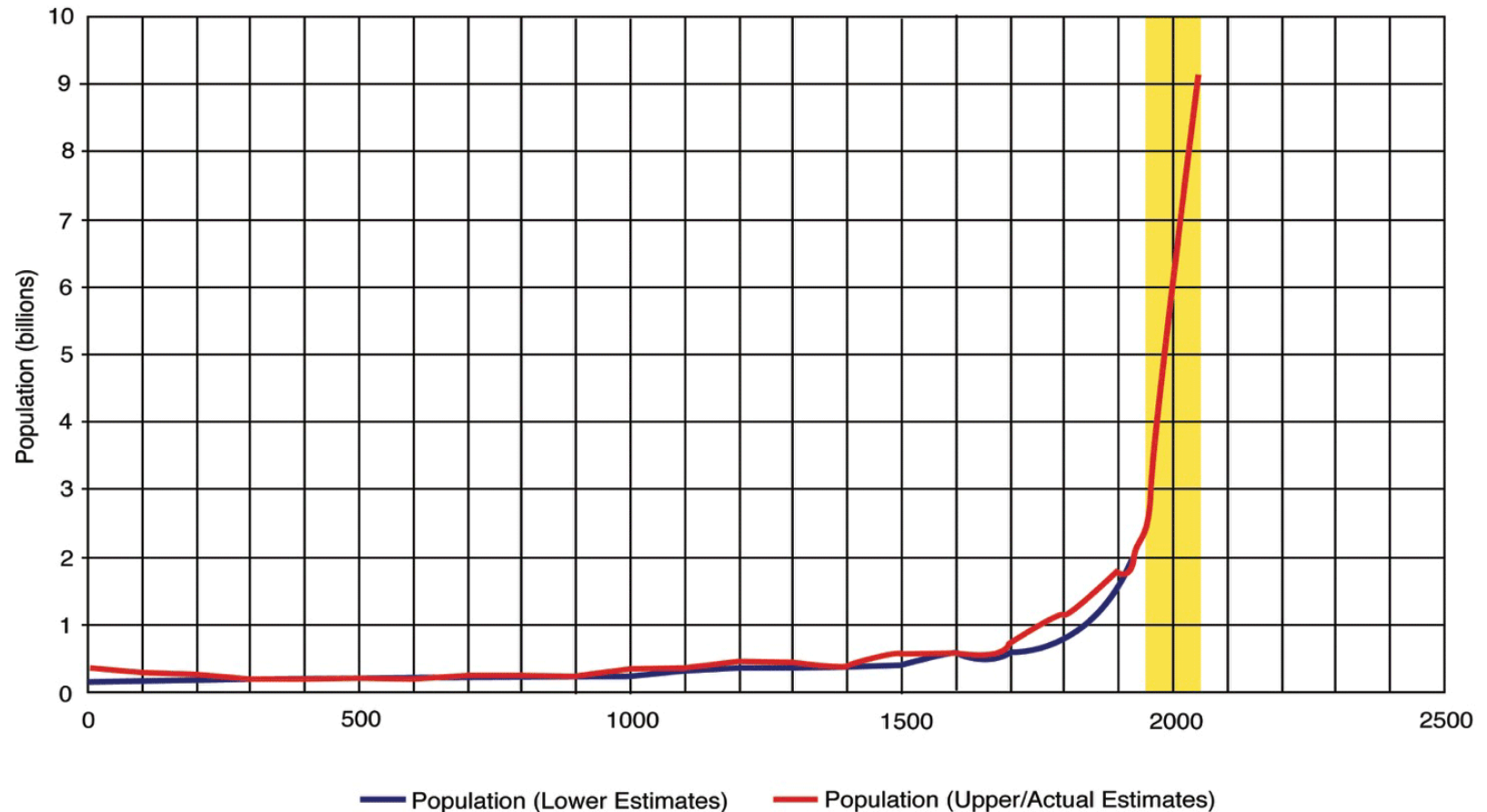
A Visual Indicator of a Larger Global Problem



The Exploding Population X Exploding Technology =

Historical Estimates of World Population

Source: U.S. Census Bureau



Carbon: A Related Co-Indicator of Disruption

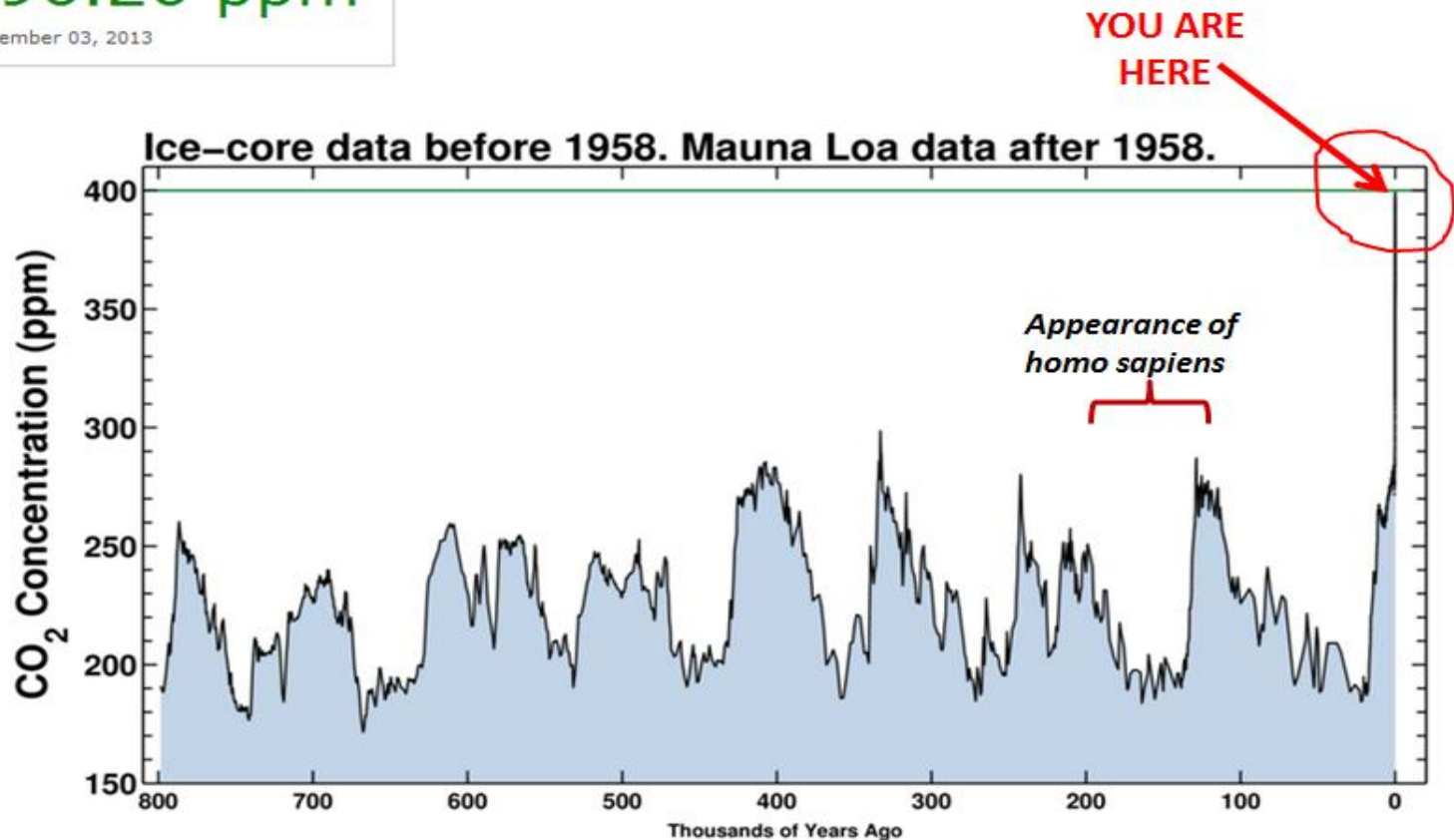
Latest CO₂ Reading

396.26 ppm

December 03, 2013

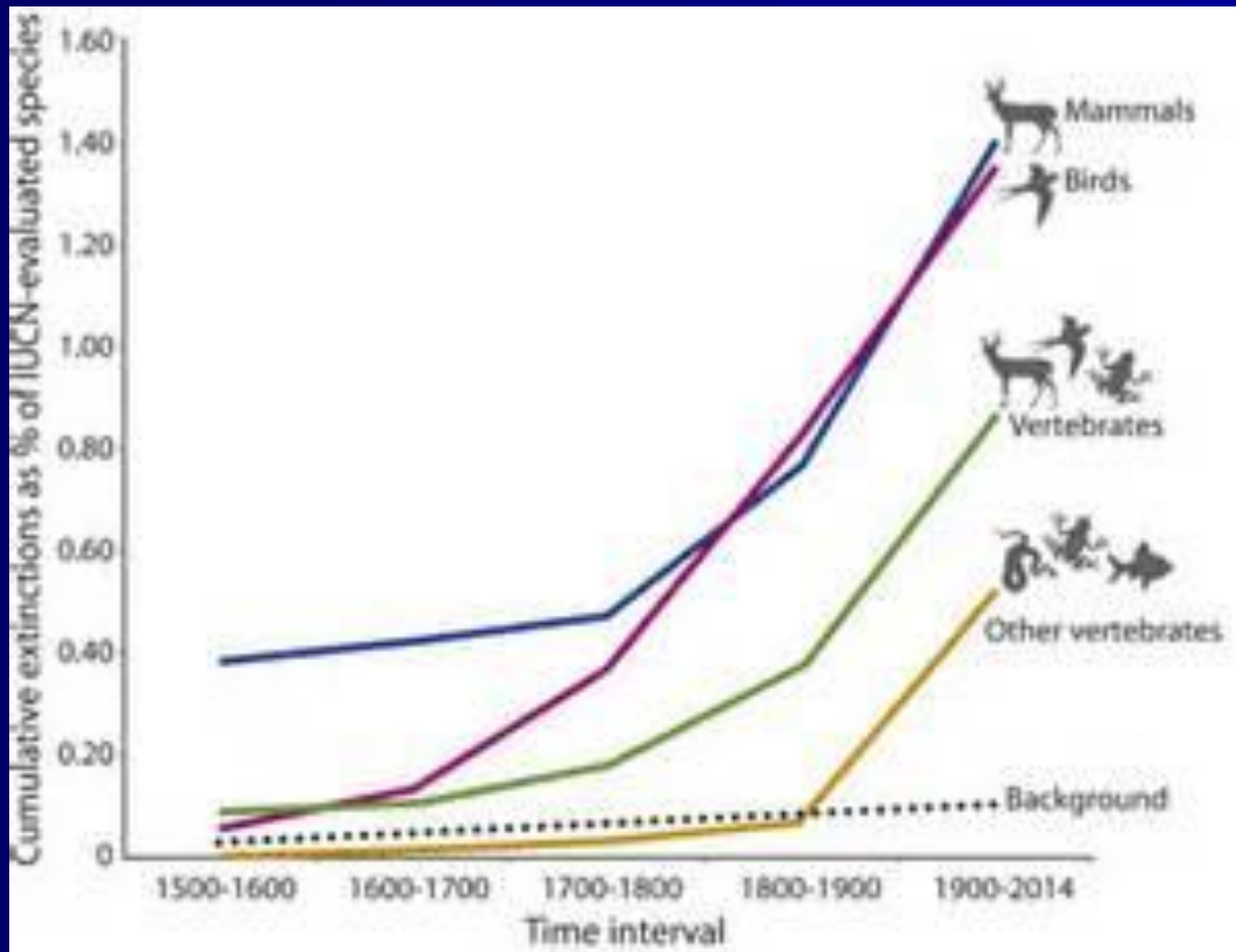
December 03 instrument

Operational



Source: <http://keelingcurve.ucsd.edu/>

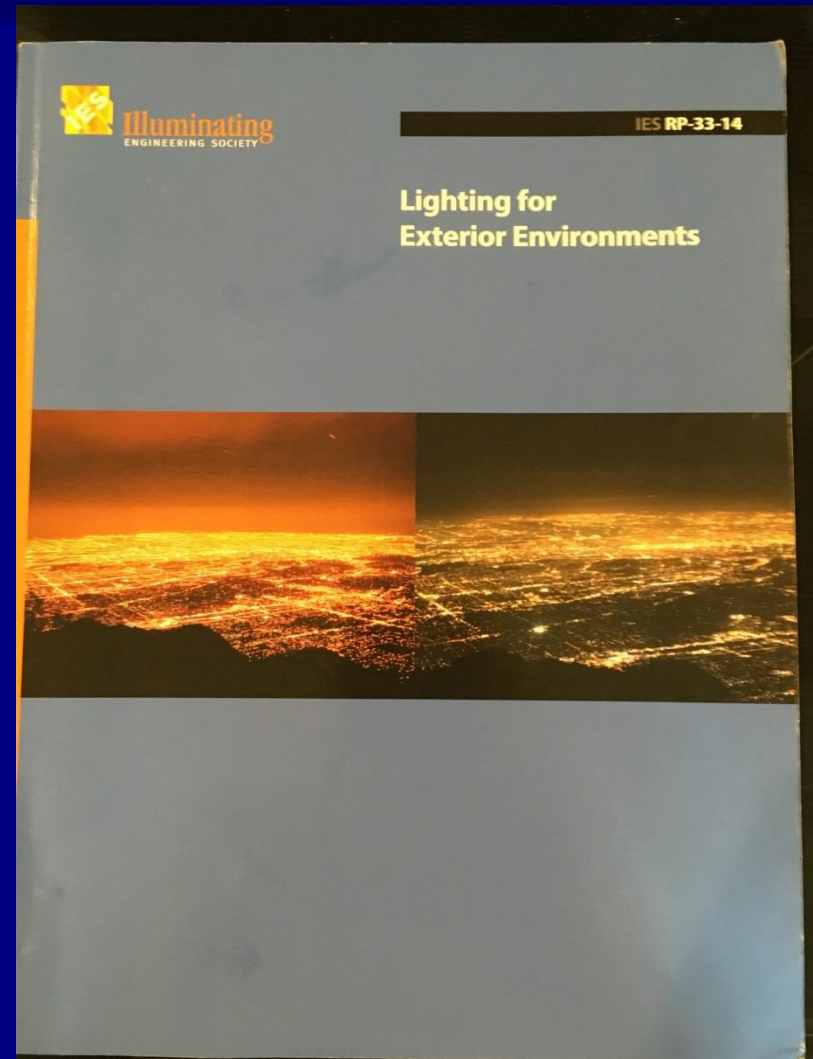
Extinctions



What Are We Asking?

Implement rational science based lighting policies using ordinance and industry practices built around the recommendations contained in relevant IES publications:

Provide lighting only when and where it is needed to meet identifiable public and private purposes while minimizing costs, pollution and other environmental impacts.



Dark Sky Parks



What You Can Do!

- Ask yourself if lighting is really needed. If so, determine what area has to be lit, how much illumination is needed, and when is the lighting required.
- Turning off non-essential lights when not needed using motion sensors (ideal for security purposes), timers and switches.
- Adjust outdoor lights so that they do not trespass on your neighbors' property where it is wasted and perhaps not wanted.
- Choose luminaires that have a flat lens that completely shades the lamp (full cutoff).
- Complain to those responsible for irresponsible lighting.