

Guidelines  
for Municipal Streetlighting in  
the Right of Way

2008

Green Energy Task Force

Susan Harder

# Useful Documents on Website:

**DARKSKYSOCIETY.ORG**

[Guidelines for Municipal Lighting in the Right of way](#)

[Better Lights for Better Nights](#) One-page sheet of line drawings of acceptable/unacceptable shielded light fixtures

[Guidelines for Good Exterior Lighting Plans](#) Developed in consultation with lighting professionals, Guidelines will help prepare exterior lighting plans that reduce light pollution, conserve energy, and help preserve dark skies.

## **Susan Harder**

International Dark Sky Association, NY Section Leader  
Lighting Designer  
Member, Standards and Practices, IESNA Roadway Lighting Cmtee  
2007 IDA Executive Director's Award  
Member, East Hampton Town Energy & Light Advisory, Riverhead Dark Sky  
Committee  
Montauk Observatory Board of Directors

## **Tom Horn**

Developed East Hampton Pilot Program for streetlighting changes

## **Leo Smith, Board of Directors,**

Board, International Dark Sky Association (IDA) - [www.darksky.org](http://www.darksky.org)  
Member, Illuminating Engineering Society of North America (IESNA)  
Roadway Lighting Committee  
Standard Practice Subcommittee  
Residential Roadway Lighting Subcommittee  
Chair, Task Force Roadway Lighting May Not Be Necessary  
Outdoor Environmental Lighting Committee  
Member, IDA/IESNA Joint Task Force on the Model Outdoor Lighting Ordinance  
Recipient, 2006 IESNA President's Award  
2006 IDA Executive Director's Award

## GUIDELINES FOR MUNICIPAL LIGHTING IN THE RIGHT OF WAY

- I. Report to Municipal Officials on current streetlighting policies and practices
- II. Guidelines for Installation and Maintenance of streetlights
  - a. Specifications for Utility Pole Mounted fixtures
  - b. Specifications for Post top Fixtures
- III. Photometric Diagrams
- IV. Application Form for installation, re-location, or removal
- V. Approval Form for installation, re-location, or removal
- VI. Requested information from Departments

# Current Roadway Guidelines

- Illuminating Engineering Society of North America, IESNA, a trade organization, developed RP 8, which only addresses “continuous roadway design”, not “spot” or utility pole mounted fixtures, written by membership, primarily manufacturers.
- Lighting Research Center: issues reports sponsored by manufacturers and utilities
- New York State Roadway Warrants -- based on traffic volume and ratio of day/night accidents

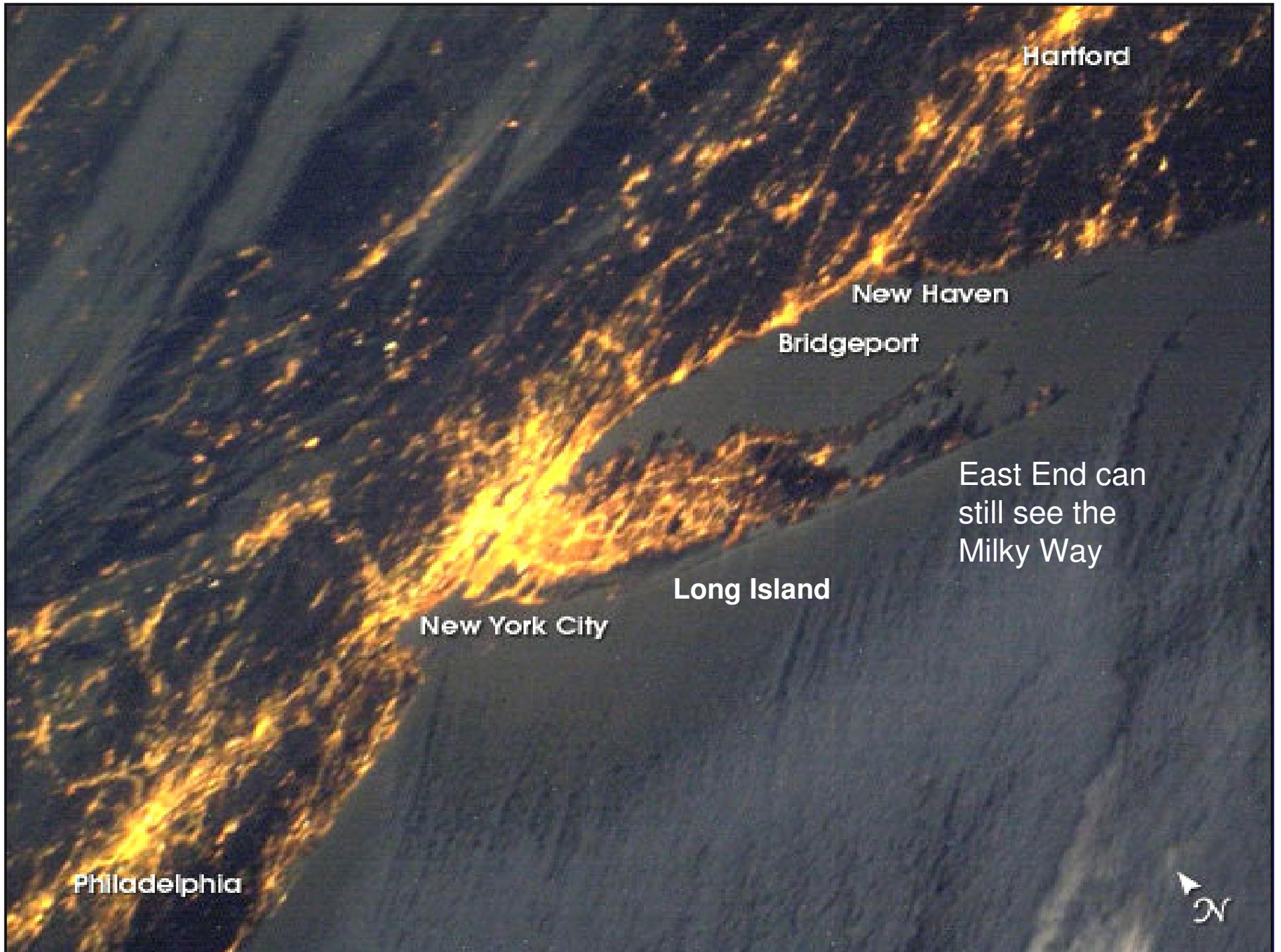
# Considerations for outdoor lighting installations:

- 1. Light levels not to exceed what is appropriate to the task and location.
- 2. Duration schedule set to meet application
- 3. Shielding thresholds for fixtures
- 4. Light source specified (bulb and Kelvin)
- 5. Establish a review process for new installations and submission requirements (including post installation inspection)

US light pollution:  
\$ 4+ billion per year







Hartford

New Haven

Bridgeport

East End can  
still see the  
Milky Way

Long Island

New York City

Philadelphia



# Light Pollution Consequences

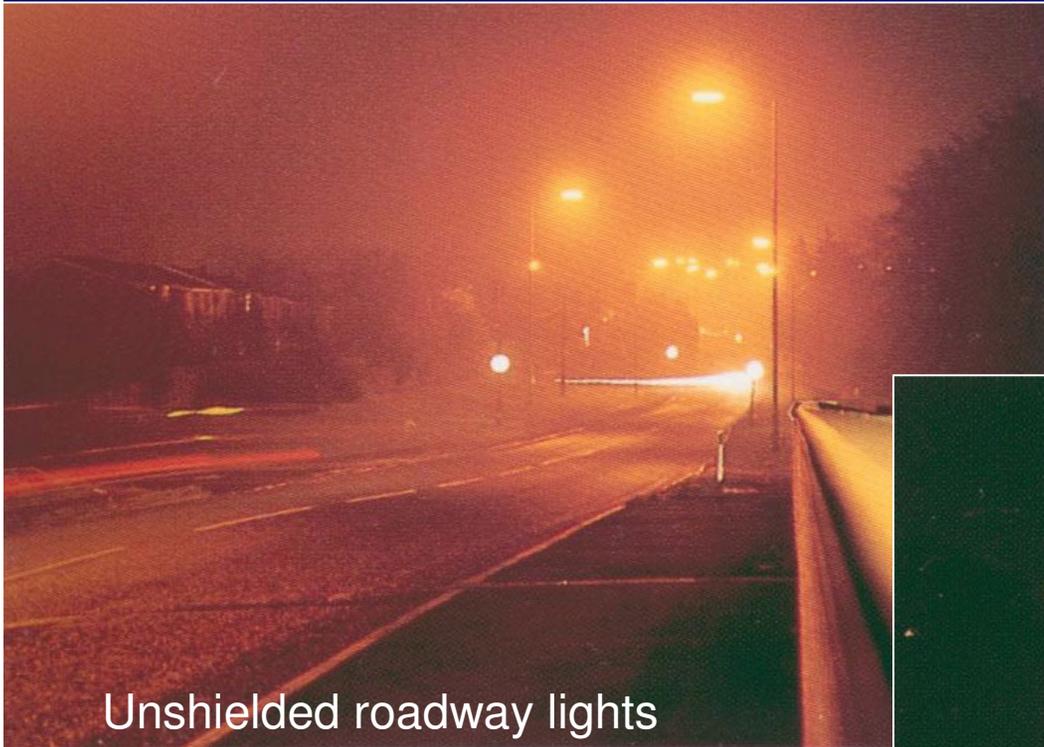
- Wasted electrical energy-- excessive or unnecessary lighting
- Light Trespass --nuisance and human health issues
- Glare and visual adaptation problems
- Ecological Disturbances
- Sky Glow and view of night sky obscured

“Sky Glow” caused by light refracting on moisture and particulate



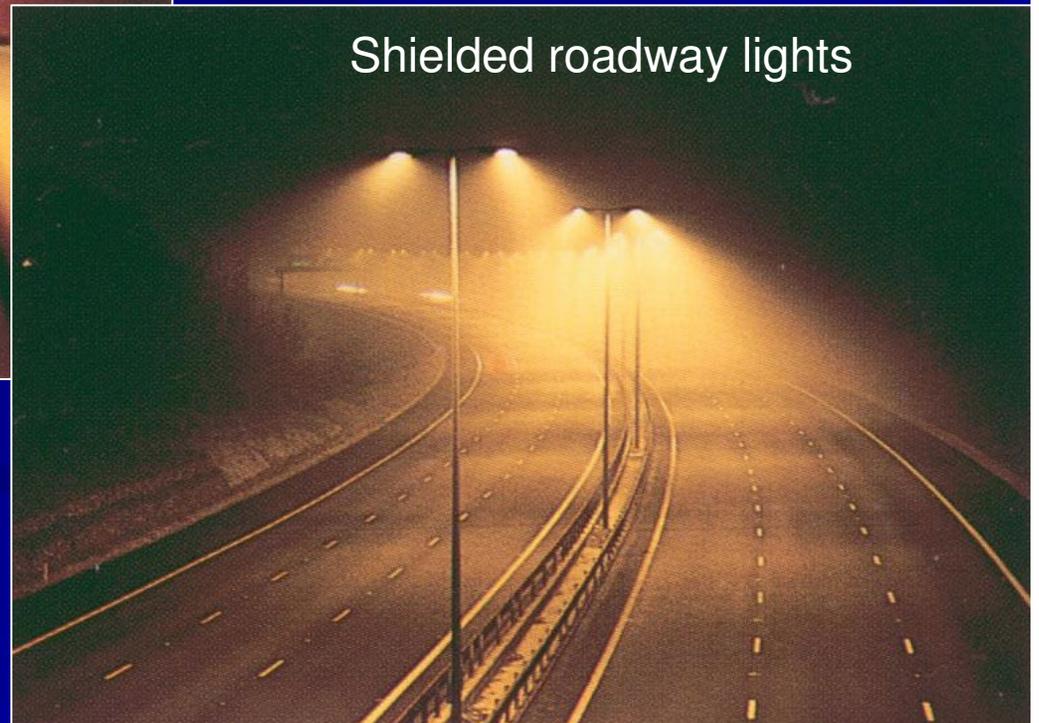
Darren Baskill, photo

Roadway Lighting is the greatest source of light pollution: glare, light trespass, and energy waste



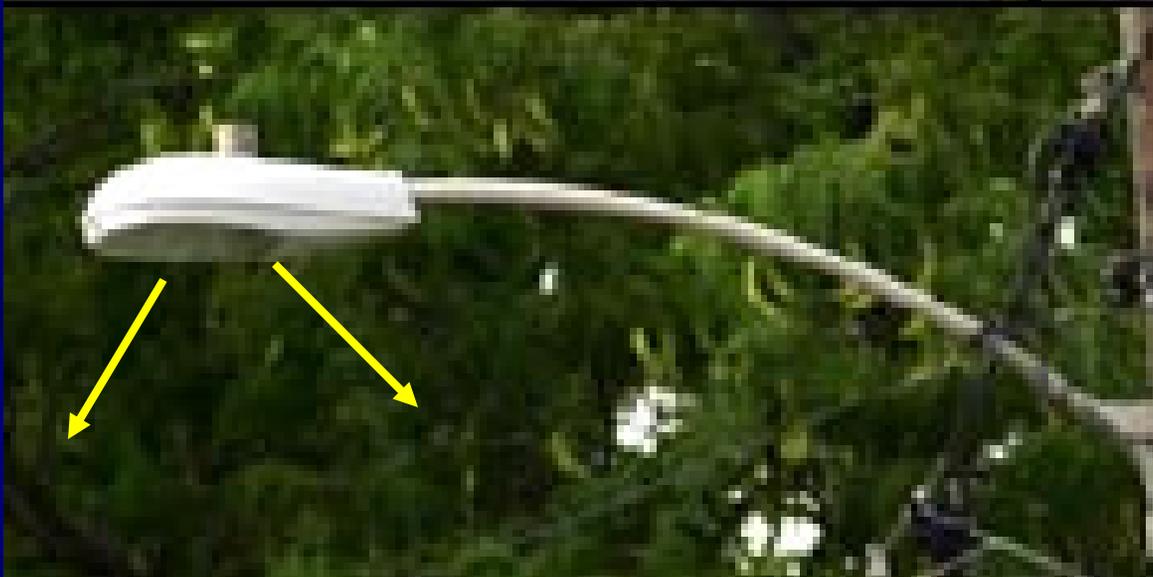
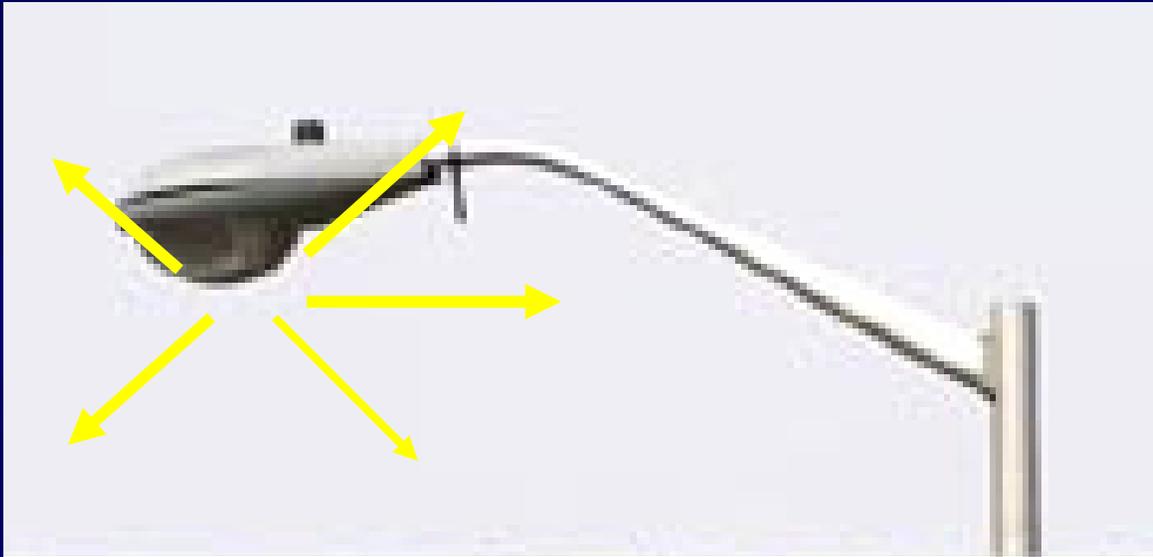
Unshielded roadway lights

**Wasted tax dollars,  
glare, light trespass,  
and energy waste**



Shielded roadway lights

# Cobrahead Streetlight innovation: Drop lens vs. Flat lens

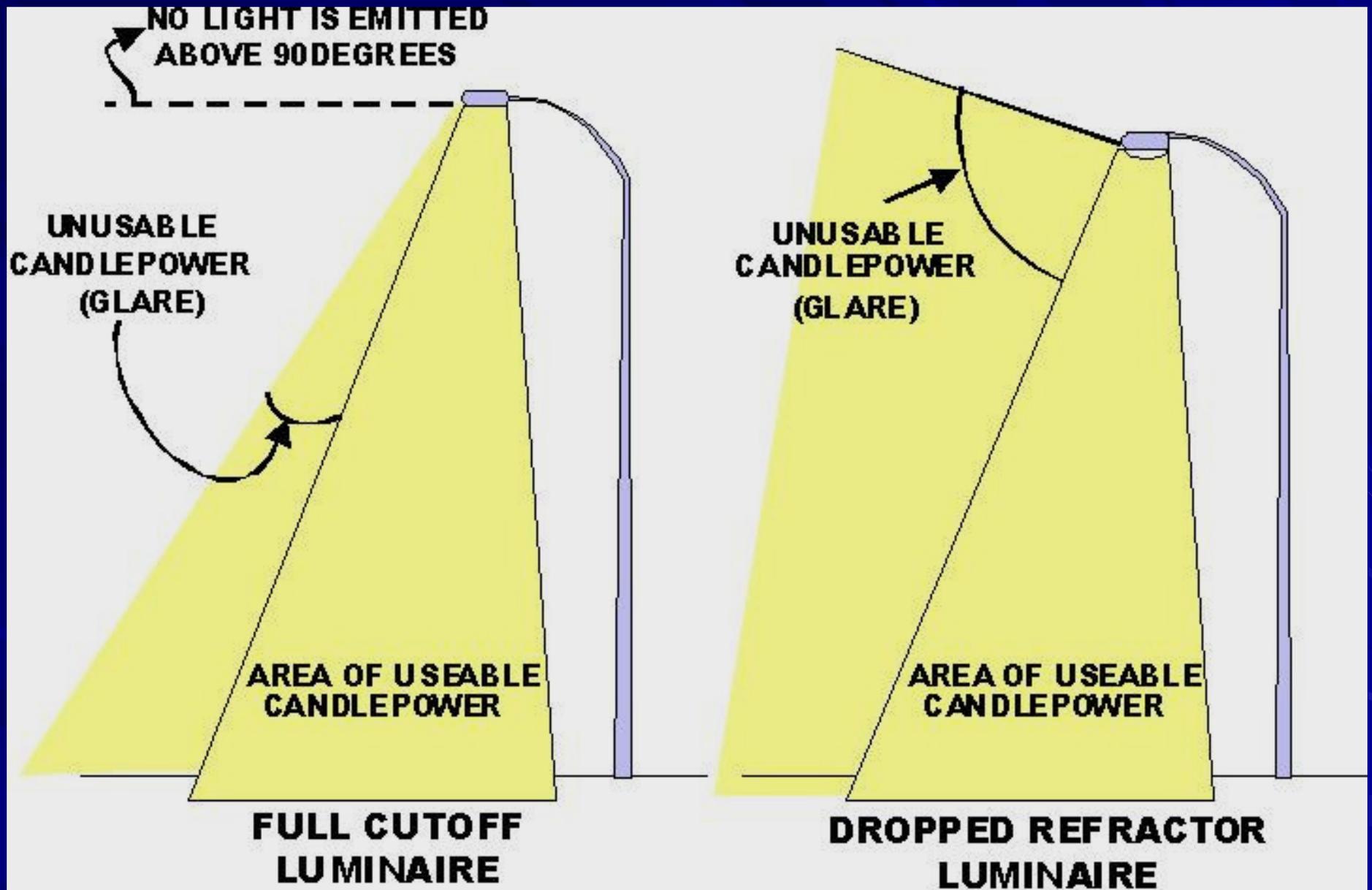


**New design being installed in New York Communities in advance of NY State Legislation:**

**East Hampton Town, East Hampton Village, Riverhead, Southampton, Brookhaven, and other municipalities**

**As well as entire states of Washington, Texas, New Mexico, Arizona, California.**

**30 to 50% of all light pollution is produced by roadway lighting that shines wasted light up and off target.**



“In Process” streetlighting conversion in Calgary, Canada to Full Cutoff fixtures, and with a reduction in wattage, saving \$1.7 million tax dollars every year. (ROI 4 yr)

ROADWAY IN CALGARY ILLUMINATED WITH FULL CUT-OFF STREETLIGHTS

Obsolete, drop-lens streetlights are glarey from a distance.

New, flat-lens streetlights cause minimal glare and no up-light (when installed level).





New York State

ASSEMBLY

**THE HEALTHY, SAFE, AND ENERGY EFFICIENT  
OUTDOOR LIGHTING ACT** to reduce harmful outdoor  
lighting.

Sets standards for outdoor lighting; provides for the designation of dark-sky preserves; defines light trespass; provides for distribution to customers by electric corporations or municipalities providing electric service of an informational pamphlet relating to outdoor lighting; and distributes a model lighting code.

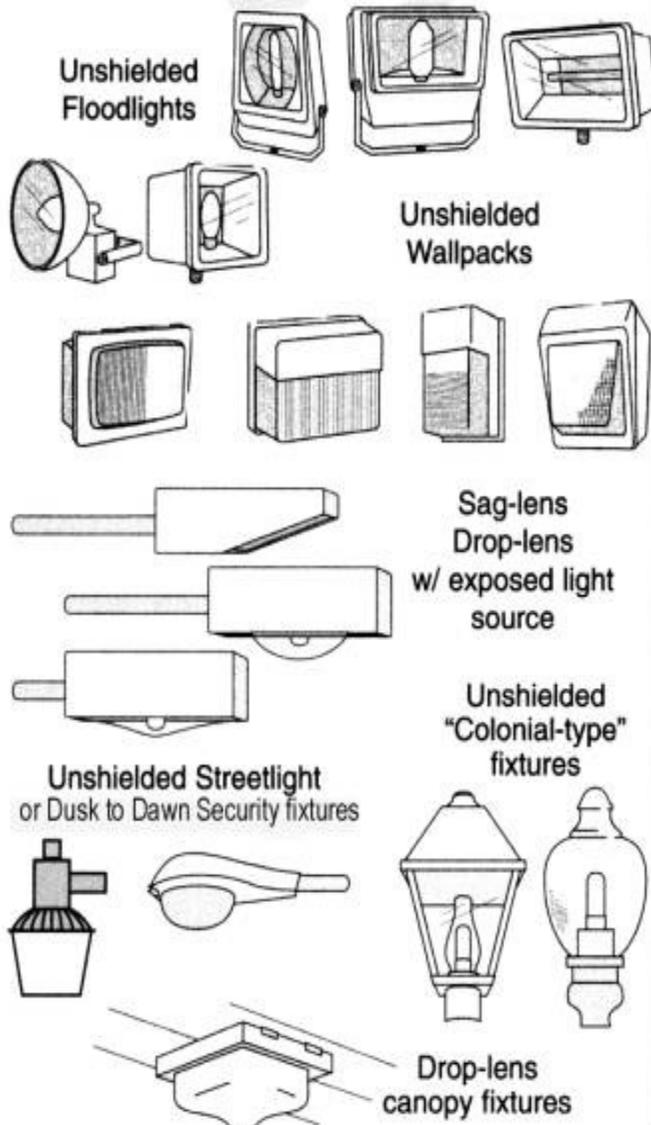
# NY State law

- Fully shielded fixtures for new and replacement fixtures (some exceptions)
- Light levels shall not exceed minimums
- Light fixtures can only be installed if a determination is made that the purpose cannot be achieved by the installation of reflectorized roadway markers, lines, warnings, or informational signs; or other passive means.

## Examples of Unacceptable/Acceptable Fixture Types

### Unacceptable / Discouraged

Fixtures that produce glare and light trespass



### Acceptable

Fixtures that shield the light source, to reduce glare and light trespass and to facilitate better vision at night.



**DIAGRAMS of  
ACCEPTABLE  
And  
UNACCEPTABLE  
FIXTURES**

**ATTACHED to all  
Building Permits in  
East Hampton,  
Riverhead, and  
Southampton, NY**

Shielded fixtures direct light toward the ground and not toward the sky while covering the light source (bulb).

# IDA APPROVED FIXTURES:

Shielded  
Fixtures are now  
available for  
every type of  
lighting  
situation.

[www.darksky.org](http://www.darksky.org)



## IDA-Approved™ Dark-Sky Friendly Fixtures



The following fixtures have been IDA-Approved™ as Dark-Sky Friendly fixtures. For more information on IDA's Fixture Seal of Approval Program, please visit the [FSA Program Homepage](#)



### [Listing of Lighting Manufacturers with IDA-Approved™ Fixtures](#)



Area -  
[Roadway -Utility](#)



Area -  
[Roadway/Parking](#)



Area -  
[High Mast](#)



Area -  
[Pedestrian Arch](#)



Area -  
[Pendants & Bells](#)



Area -  
[Post Top - Arch](#)



Area -  
[Post Top - Period](#)



Area - Shoe Box  
[Parking /  
Pedestrian](#)



Area -  
[LPS Luminaires](#)



Area -  
[Wall Mounted](#)



Wall Mounted  
[Sconce](#)



Wall Mounted -  
[Period](#)



Wall Mounted -  
[Utility](#)



Wall Mounted -  
[Cylinders & Cans](#)



Wall Mounted -  
[Facade & Sign](#)



[Canopy](#)



[LED Luminaires](#)



[Sports -  
Field/Court](#)



[Industrial](#)



[Ped/Land - Bollards](#)



# Solar Streetlights



Type: GES-030

1.



Type: GES-033

2.



Type: GES-034



Type: GES-035



Type: GES-036

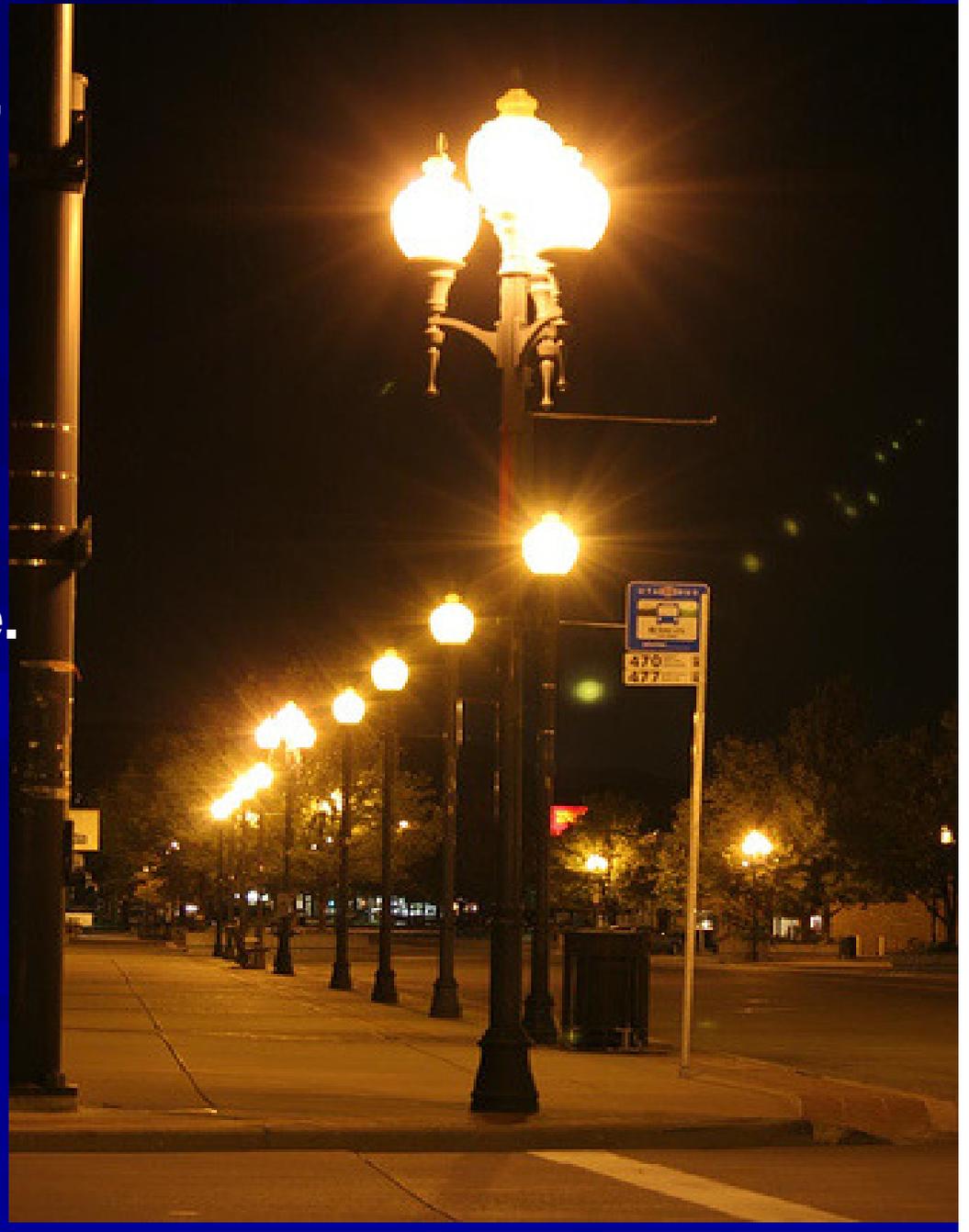
# Full cutoff sports lighting



**“Main Street Revitalization” projects often result in poorly designed “historic” fixtures with high glare.**

**Studies show that glare makes people feel less safe.**

**When areas are deserted, fixtures can be fitted with middle of the night shut offs.**



Sag Harbor “historic fixture”

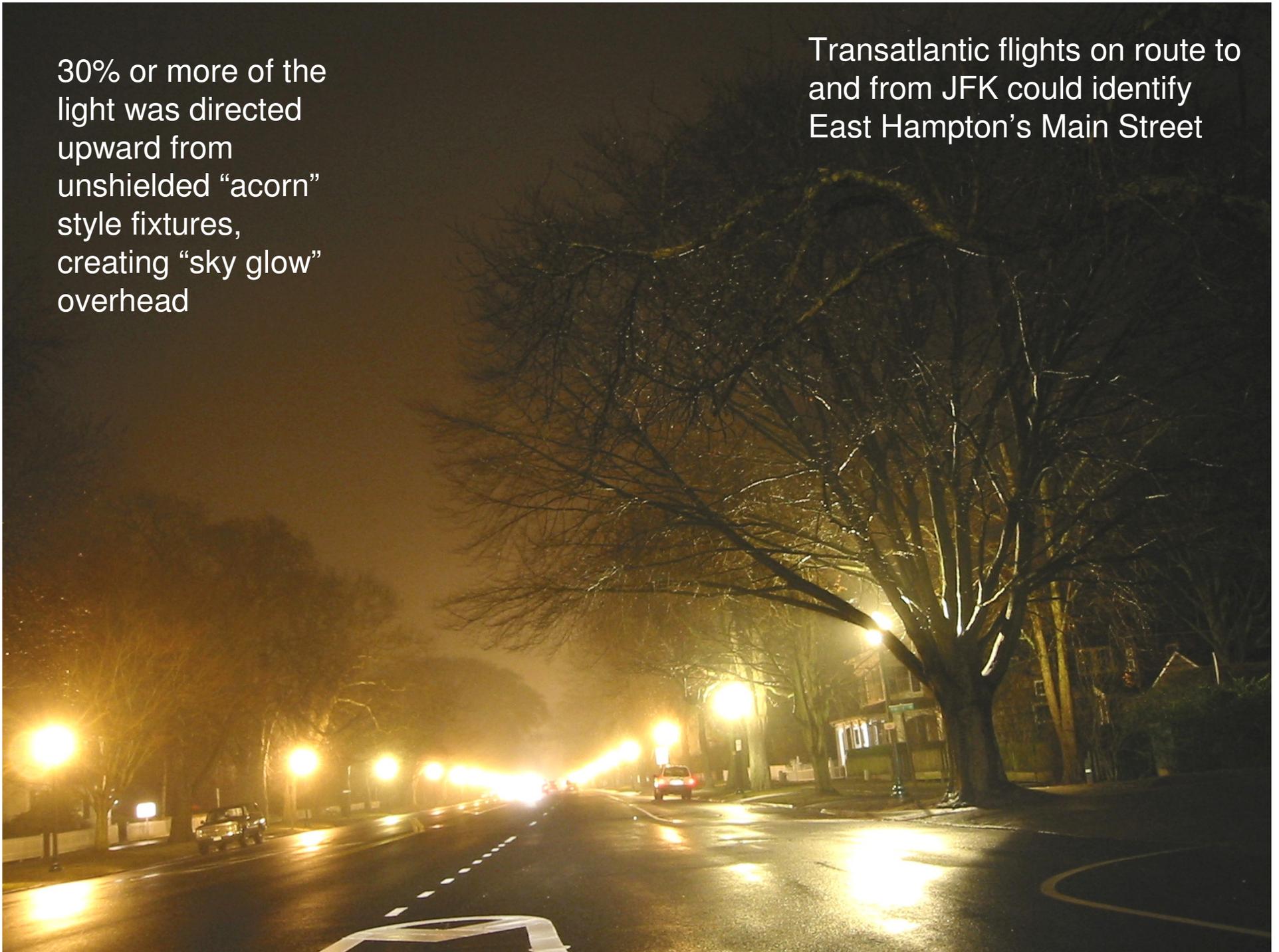


Port Jefferson “historic fixture”



30% or more of the light was directed upward from unshielded “acorn” style fixtures, creating “sky glow” overhead

Transatlantic flights on route to and from JFK could identify East Hampton’s Main Street



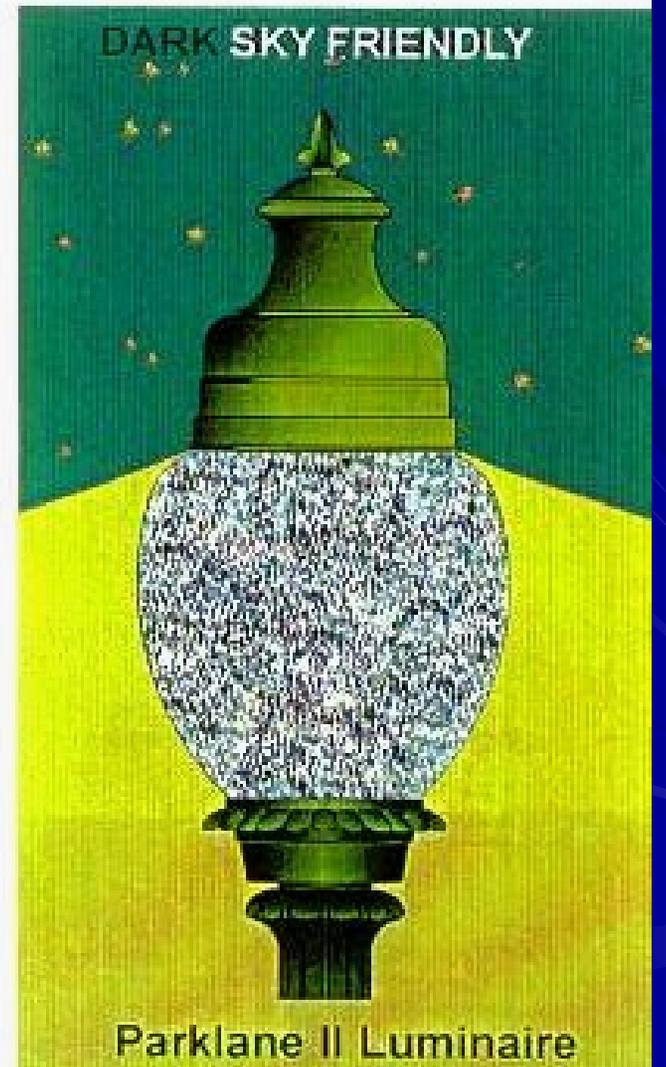
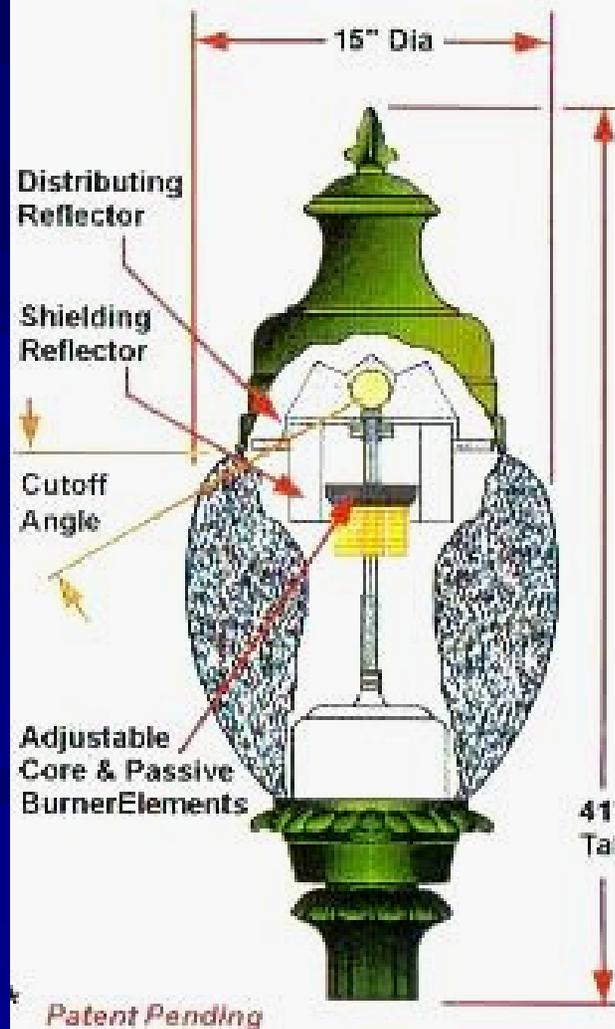
# Substitute for unshielded "acorn" fixture by Penn Globe

Manufacturer lent a demonstration model to view at night

\$40,000 cost recovered in five years.

## The Solution: *The PennTrol*<sup>TM</sup> System\*

*The PennTrol*<sup>TM</sup> Reflector System\* virtually eliminates the glare AND up-light so often associated with refractor globe type luminaires.



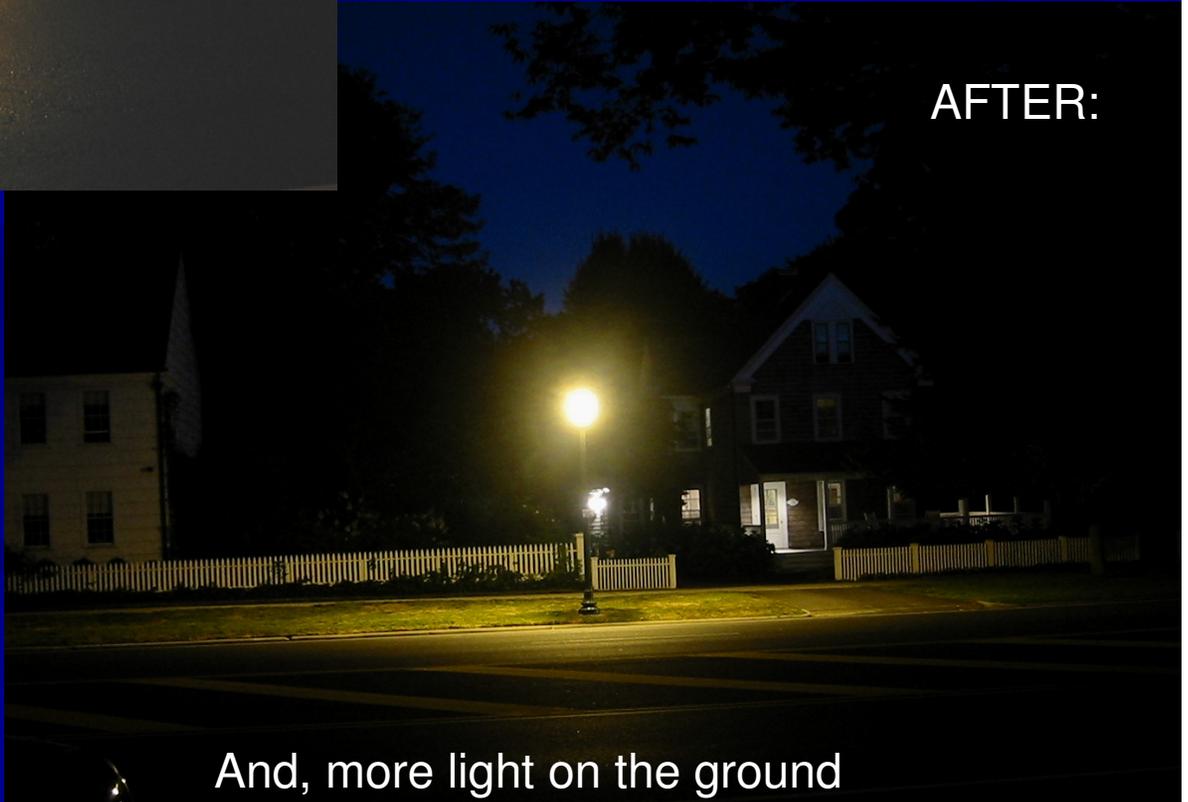
BEFORE:



Light Trespass on the roofs,  
windows, and walls of the  
houses



AFTER:



Homeowner now turns  
on his porch light.



And, more light on the ground

# Steven W. Lockley, B.Sc. (Hons), Ph.D.

Division of Sleep Medicine    Brigham and Women's Hospital

## Harvard Medical School

May 31, 2008

“Fixtures which permit horizontal and vertical light are not only inefficient and unnecessary but also emit light inappropriately into living spaces, particularly bedrooms.

*This light intrusion, even if dim, is likely to have measurable effects on sleep disruption and melatonin suppression, particularly in those whose bedrooms might be in close proximity to streetlights.*

Intrusive street lighting, as well as wasting money and energy, is likely to have an adverse effect on human health, effects which are entirely avoidable with better planning of urban lighting fixtures.”

Lighting 101

# Electric Lighting

ONLY a 100 year old invention

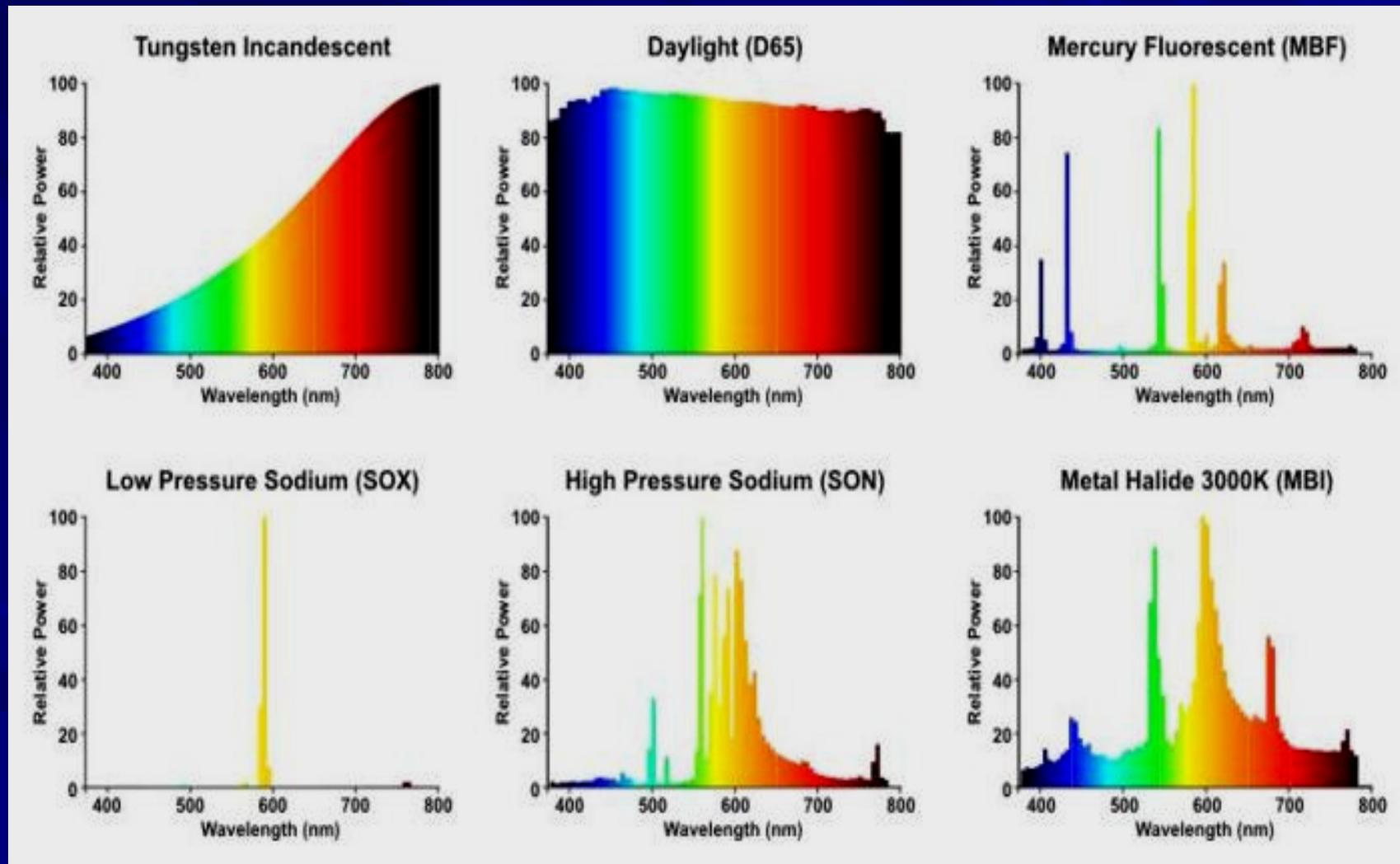


Edison 1879

Permits night activities for humans. BUT: light affects flora, fauna, and human health, all which have evolved in a dark/light environment.

# Light Bulbs produce “false” light

ONLY “Daylight” is full spectrum: equal amounts of each “color”



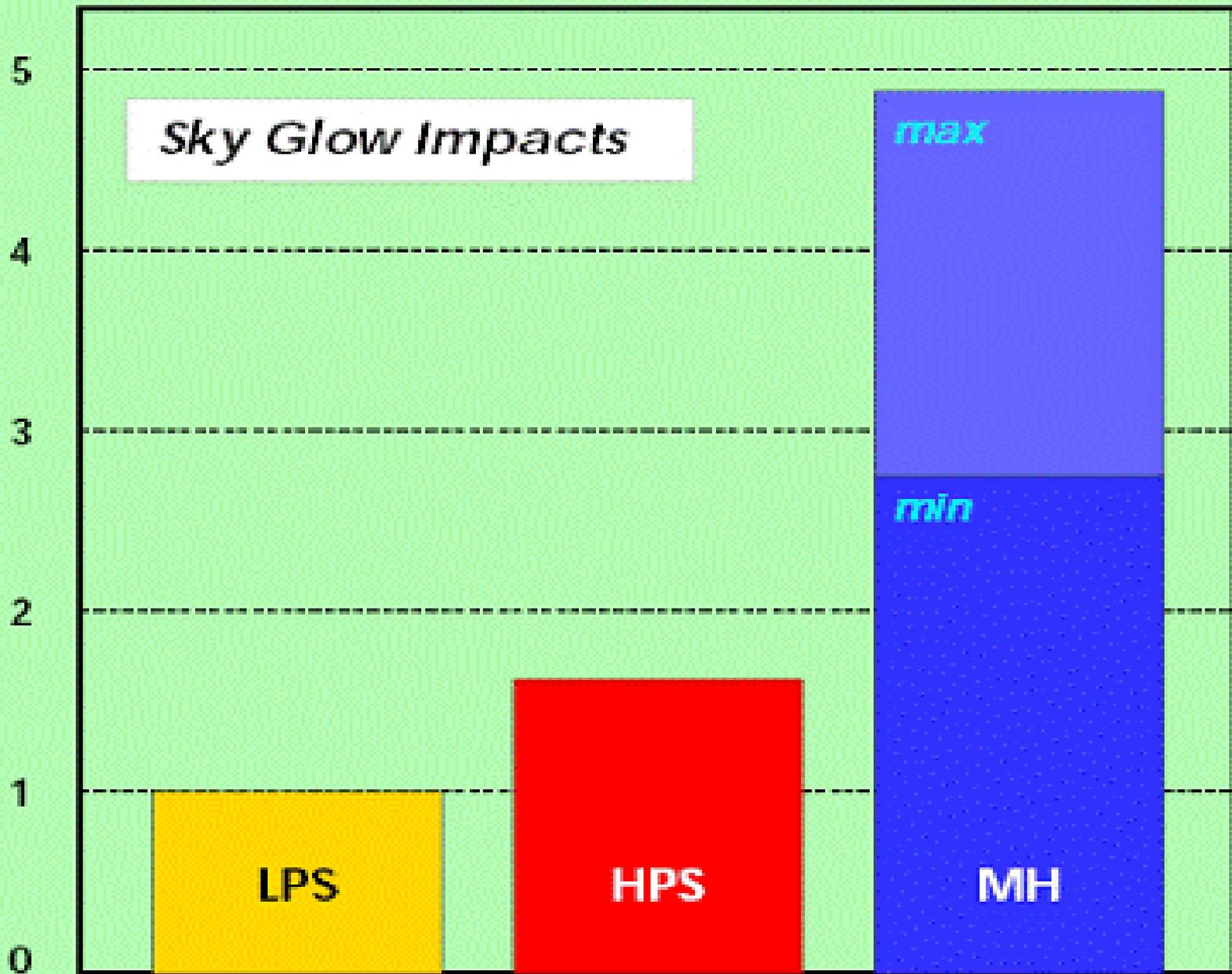


Figure 3. Sky Brightening Impacts of MH and HPS lighting relative to LPS

Flora and fauna have evolved over hundreds of millions of years in a bright day - dark night cycle with moon phase stimulated behaviors

Light Pollution disrupts habitats and behaviors of:

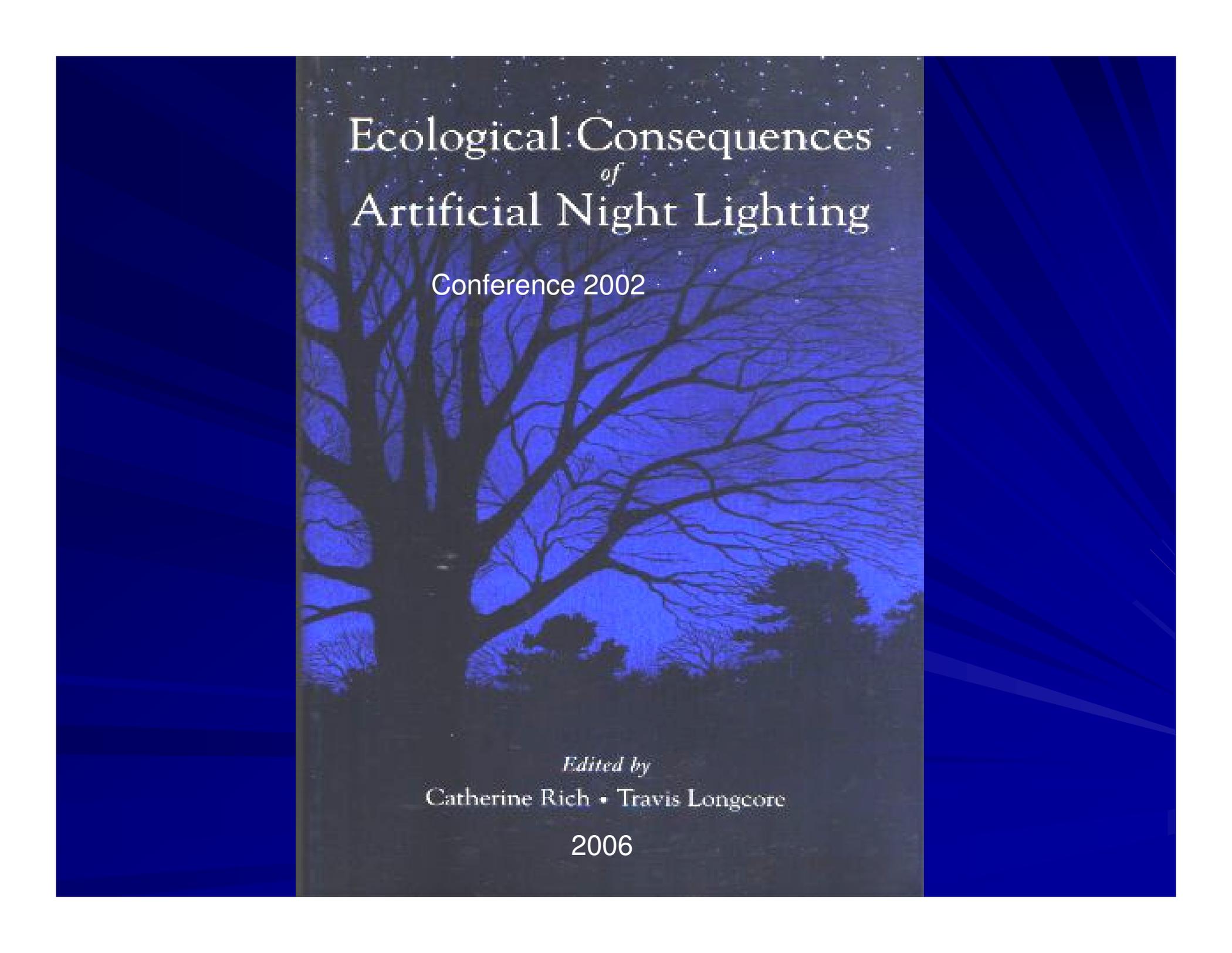
- **MAMMALS**
- **BIRDS**
- **REPTILES and AMPHIBIANS**
- **FISHES**
- **INVERTIBRATES**
- **PLANTS**

# Birds migrate at Night



National Bird Migration "Day"

---Harper 2000



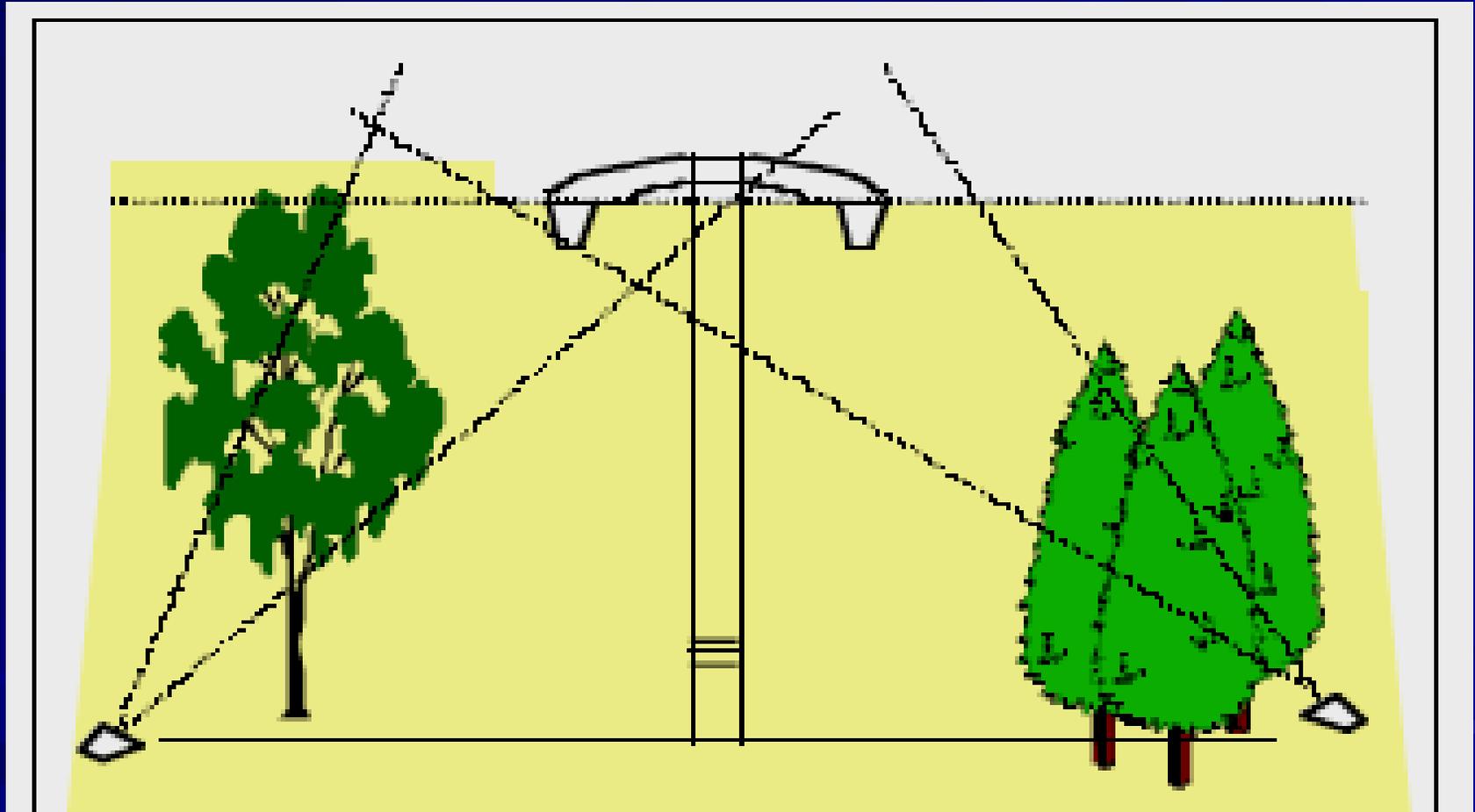
Ecological Consequences  
*of*  
Artificial Night Lighting

Conference 2002

*Edited by*  
Catherine Rich • Travis Longcore

2006

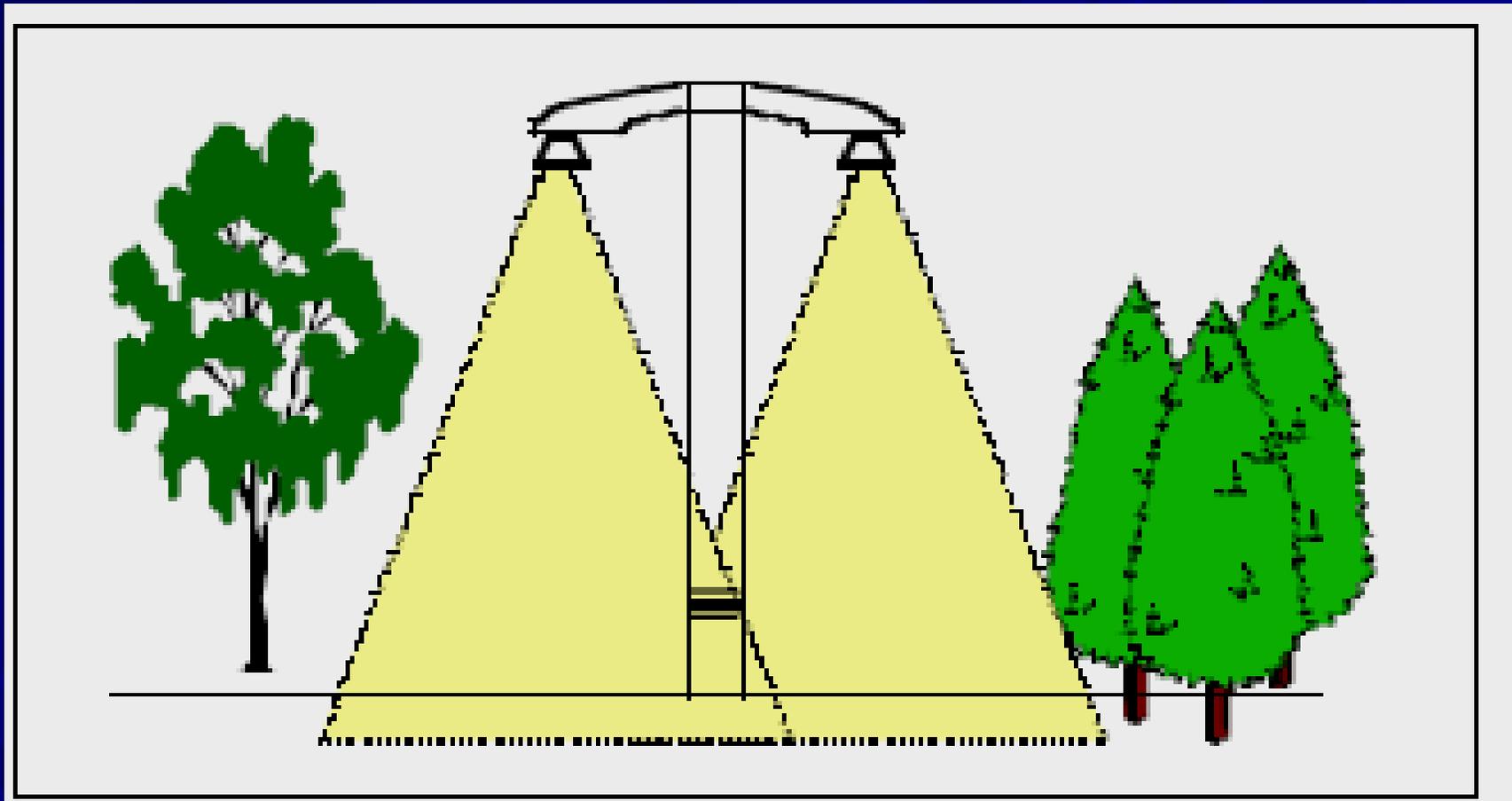
# Poor lighting design



**Amagansett, NY tree holding leaves longer in the same pattern as the semi cutoff fixture, not achieving full dormancy before winter weather sets in, shortening tree life.**



# Better lighting design



# East Hampton “Pilot Program”

- Area selected for the program is representative of different zones: residential, commercial, major highway
- Retrofits to full cutoff design
- Shut offs for non-feeder streets
- Middle of the night shut off sensors installed
- Prior to new installations: must meet warranting review

# Cobrahead streetlights





What is this fixture illuminating?

# Nature Preserve

## The Atlantic Double Dunes Preserve

The Atlantic Double Dunes, stretching along three miles of shoreline from Amagansett to the Village of East Hampton, provide important habitat for plant and animal species:

Nearly 100 species of plants occur here, including some that are rare.

Federally threatened piping plovers and state endangered least terns find refuge here. Fowler's toad, the country's only marine edge amphibian, lives here year round.

This living dune system is susceptible to trampling and other human impacts.

**YOU CAN HELP BY STAYING OFF THE DUNES.**

To protect this fragile place, the preserve is open by guided tour only.

Please contact The Nature Conservancy  
at 631 329 7689 for more information



When do the restrooms close?

- **Time Switch / Photo control**  
Cuts Energy costs in half.  
Lights go on at dusk  
off at your pre-set time



# GE Powerflood Turnpike fixtures: LIPA agrees to: NO MORE new utility pole installations



16,000 of these fixtures currently installed all over Long Island will be phased out.



# LIPA offers shielded fixtures

**Introducing LIPA's Solution to  
Your Outdoor Lighting Needs!**



- It's Business Friendly
- It's Sky Friendly



**Smart New Outdoor Lighting Ideas from the  
Solution Providers at LIPA.**