Proposal to create Native Tree Clusters and Native Plant Meadows and curb light pollution in South Brunswick Township, NJ

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https://savenativeplants.wordpress.com/

The scientific community is raising red flags on the rapidly declining insect population.

For the past few years, New Jersey is experiencing a wetter, warmer weather making it more difficult for native insects to survive.

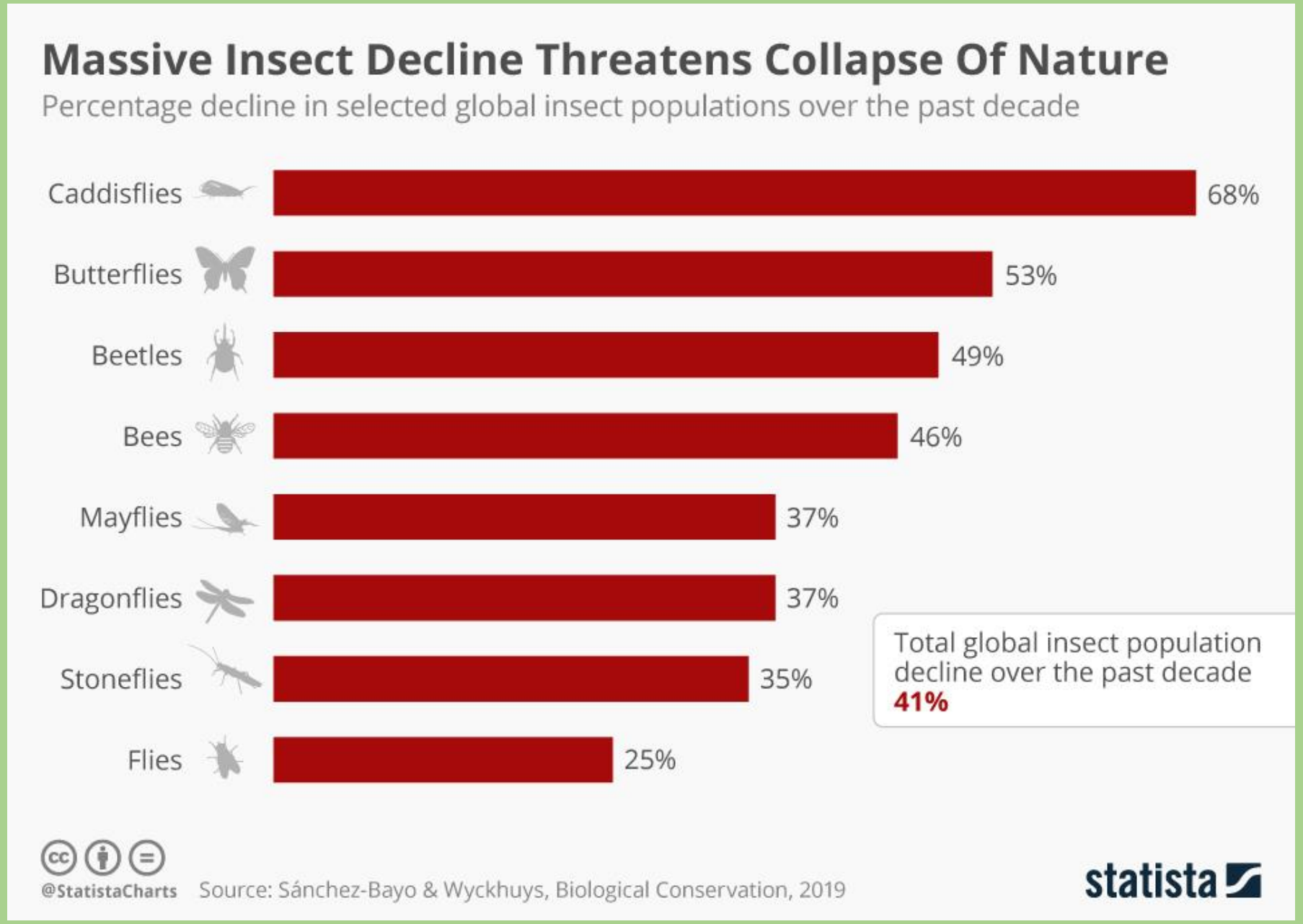
The use of pesticides, fertilizers, weed killers has increased, creating havoc for the insects, amphibians and other wild fauna.

Populations of native plants, trees and fauna are shrinking with growing urbanization and the serious threat of light pollution.

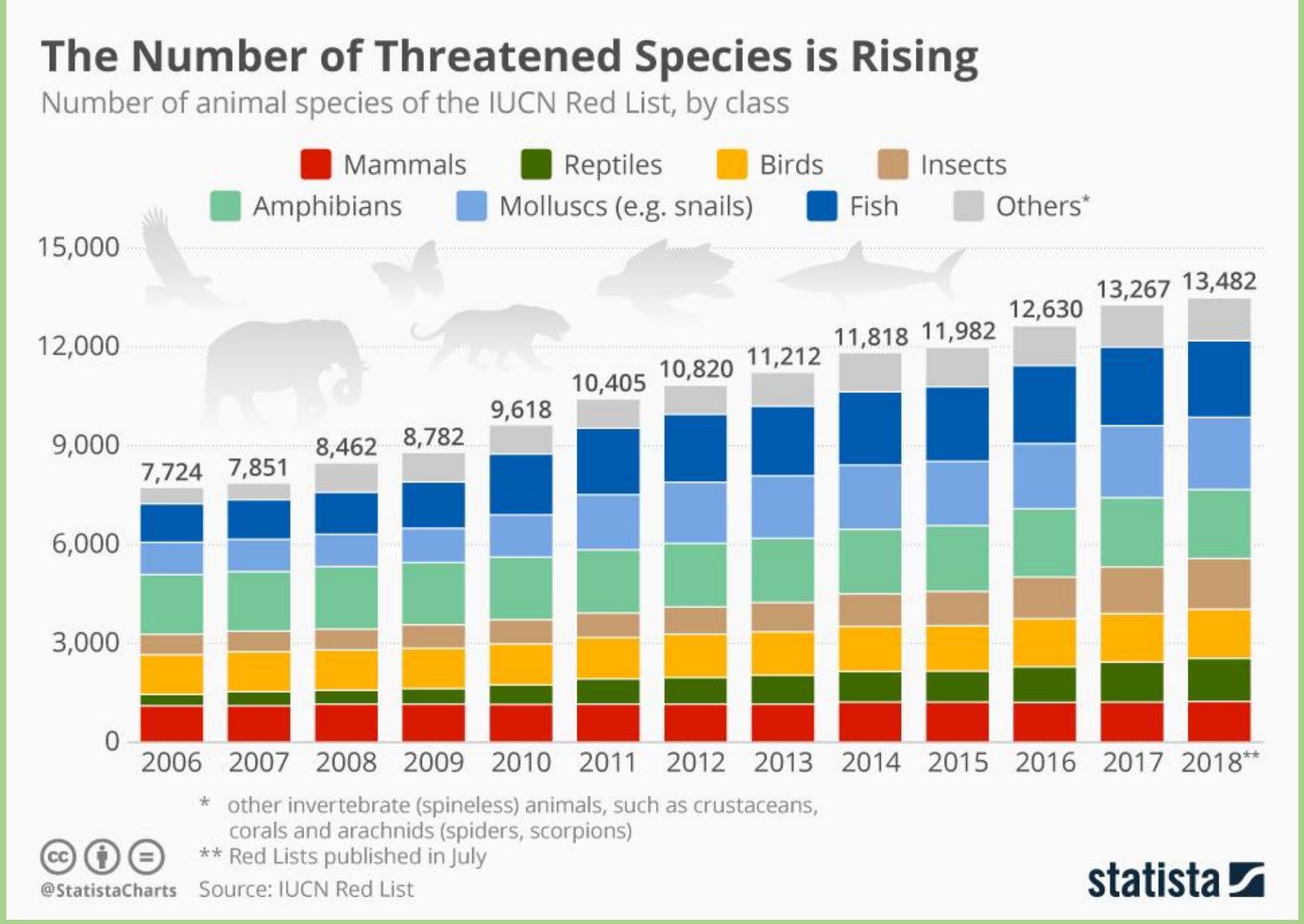
The next few slides emphasize the above points with published articles and statistics.

NEW YORK TIMES EDITORIAL BOARD REPORTS IN AN ARTICLE TITLED "INSECT ARMAGEDDON"
https://www.nytimes.com/2017/10/29/opinion/insect-armageddon-ecosystem-.html

There is alarming new evidence that insect populations worldwide are in rapid decline. As Prof. Dave Goulson of the University of Sussex, a co-author of a new insect study, put it, we are "on course for ecological Armageddon" because "if we lose the insects, then everything is going to collapse."



https://www.statista.com/chart/16960/percentage-decline-in-selected-global-insect-populations/

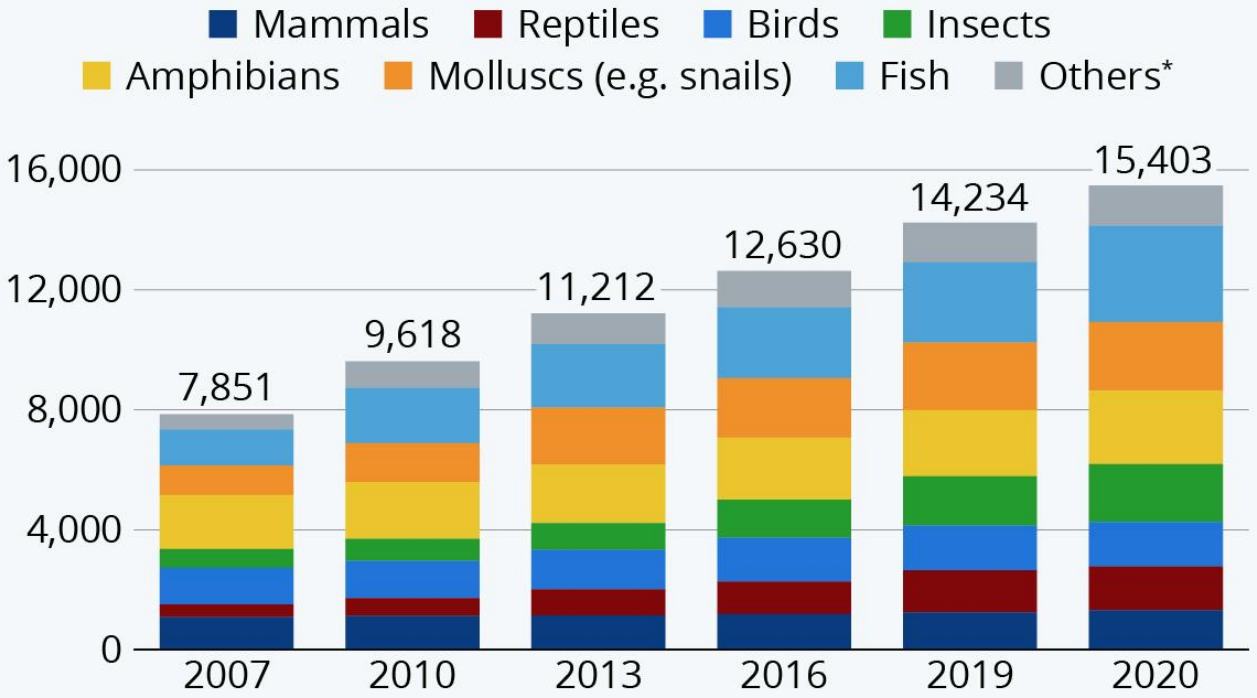


ICUN -The International Union for Conservation of Nature

https://www.statista.com/chart/17122/number-of-threatened-species-red-list/

The Number of Endangered Species is Rising

Number of animal species of the IUCN Red List, by class



* other invertebrate (spineless) animals, such as crustaceans, corals and arachnids (spiders, scorpions)

Source: IUCN Red List

statista

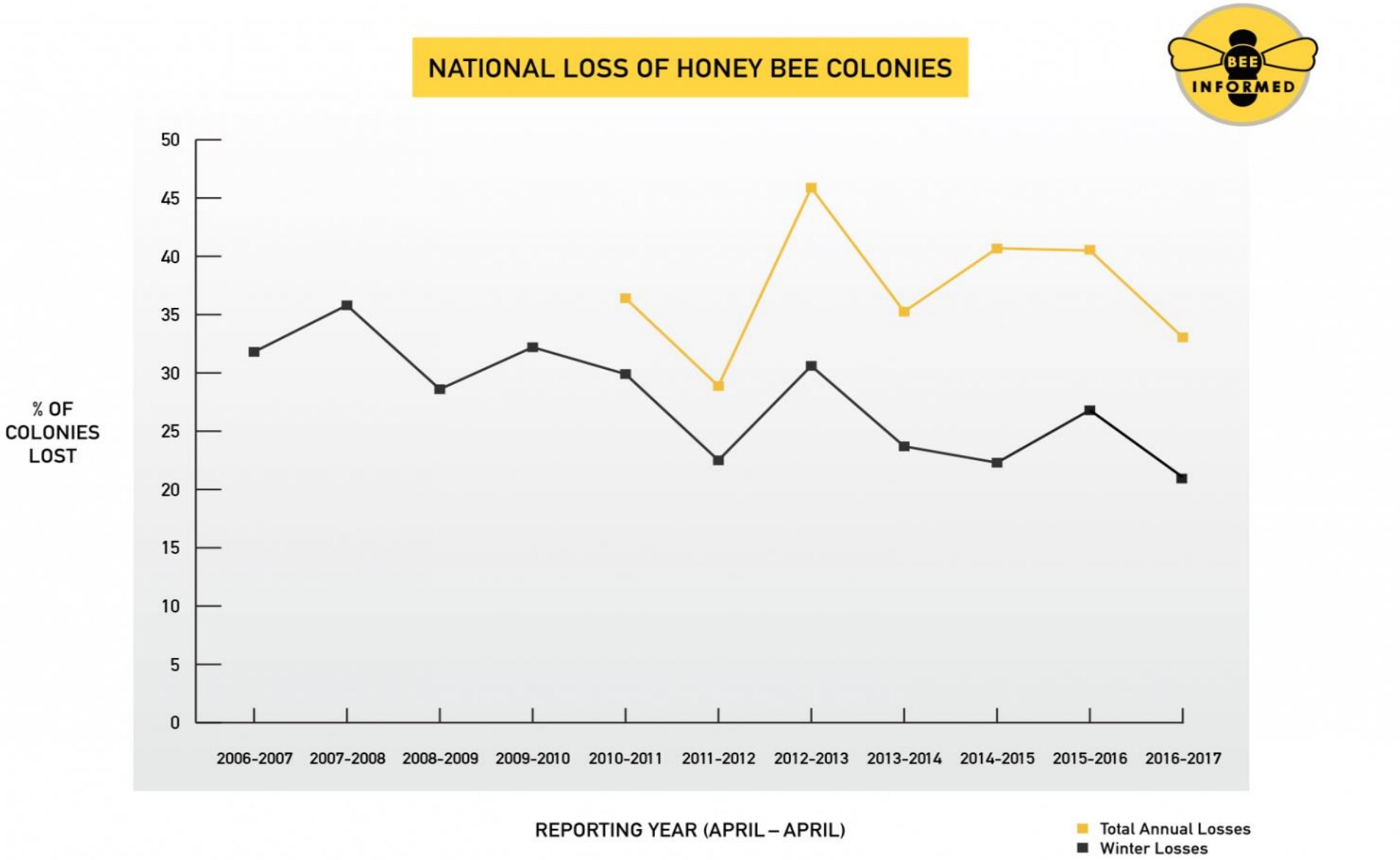
https://www.statista.com/chart/17122/number-of-threatened-species-red-list/

e-COMERCIO AGRARIO

Digital newspaper of political and economic news of international agriculture

The Newspaper on international agriculture “Comercio Agrario” in its March 2nd edition says that the increase in temperature by approximately 2 ° C and increase in CO_2 concentration, more instances of extreme weather has caused displacement of more than 600 pests and plant diseases towards the poles at an average of 2.7km/year.

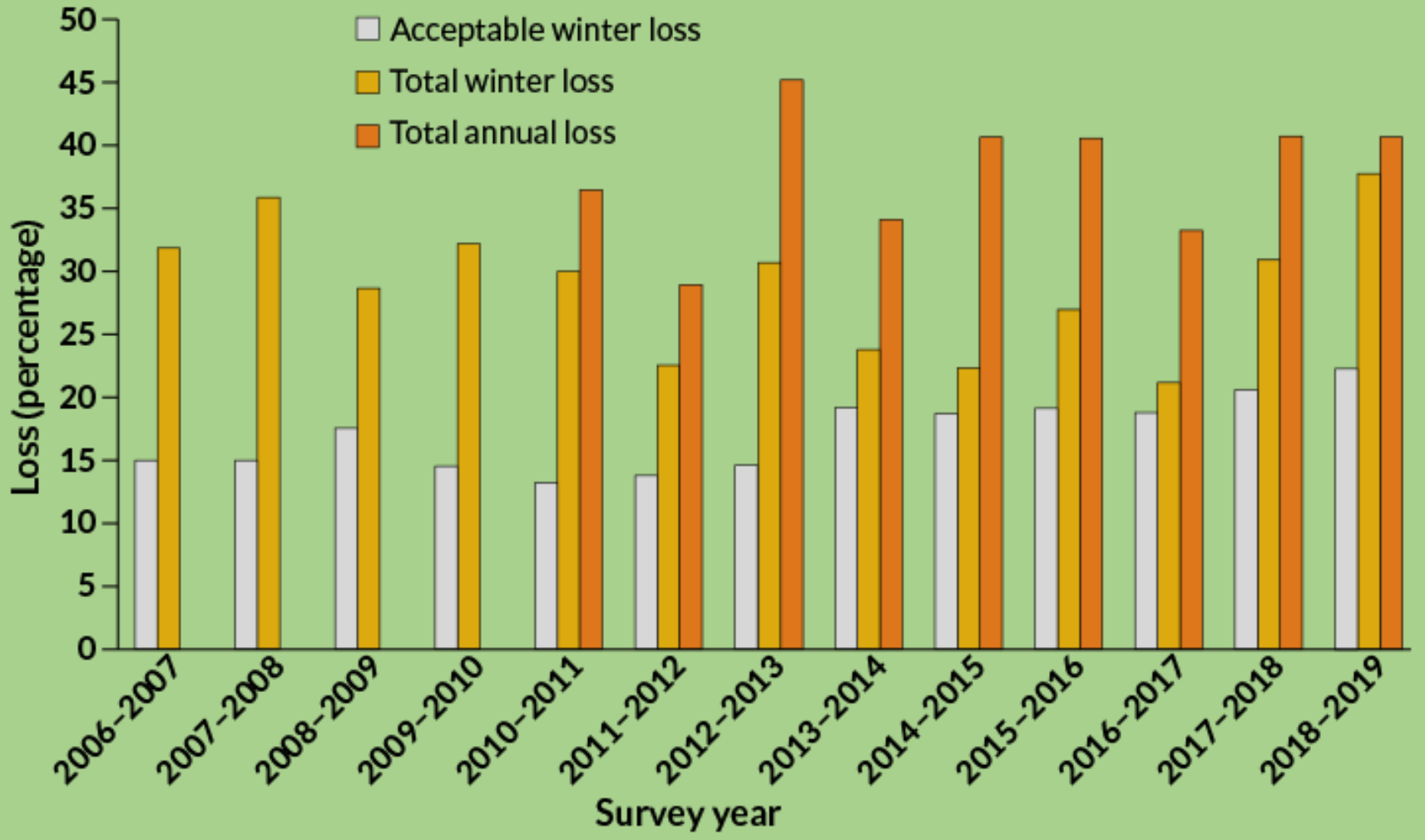
http://ecomercioagrario.com/en/climate-change-increases-the-population-of-insect-vectors-and-contributes-to-the-expansion-of-agricultural-pests



https://3c1703fe8d.site.internapcdn.net/newman/gfx/news/hires/2017/nationsbeeke.png

U.S. honeybees had the worst winter die-off in more than a decade

Varroa mites and diseases did the most damage, but weather disasters didn't help



https://www.sciencenews.org/article/us-honeybees-had-worst-winter-die-more-decade

What has precipitated this decline of insect populations?

- Rampant development has led to destruction of habitats, areas of feeding, mating and shelter have disappeared.
- Alteration of natural stream flow (e.g. developments on Mount Road, England Road)
- Removal of aquatic vegetation
- Abundant use of pesticides, weed killers and other toxin runoffs
- Replacement of native flowers and grasses with alien exotic species in our front yards
- Surrounding nurseries keep more alien plants than native varieties.
- Parasites e.g. invasive mite species *Varroa destructor* affecting bee populations.
- Virus, fungal and other infections due to climate change.

WHY NATIVE PLANTS?

- **Native plants** provide shelter and food for wildlife and support pollinators.

- **Native plants** attract a variety of birds, butterflies, and other wildlife by providing diverse habitats and food sources.

- The economic benefits of **native plants** can also be measured against the damage that certain non-**native plants** do.

- **Native plants** are easier to grow and are already adapted to our soil and climate. They don't need extra chemicals in the form of costly chemical fertilizers and pesticides to grow and thrive.

WHY NATIVE PLANTS? CONTINUED…

- Most of the insect herbivores can only eat plants with which they share an evolutionary history over millions of years.

- Our native insects cannot use these new imported plants for food, and their populations have suffered tremendously in the areas where alien species have taken hold.

- If native plant diversity is high, animal diversity remains high as well.

WHY NATIVE PLANTS? CONTINUED…

e.g. The tables below show the ability of native woody plants to support lepidoptera species.

Common Name	Species Supported
Oak	534
Willow	456
Cherry, Plum	456
Birch	413
Poplar, cottonwood	368
Crabapple	311
Blueberry, cranberry	288
Maple, box elder	285
Elm	213
Pine	203

Common Name	Species Supported
Hickory	200
Hawthorn	159
Alder	156
Spruce	156
Ash	150
Basswood, linden	150
Filbert, hazelnut	131
Walnut, butternut	130
Beech	126
Chestnut	125

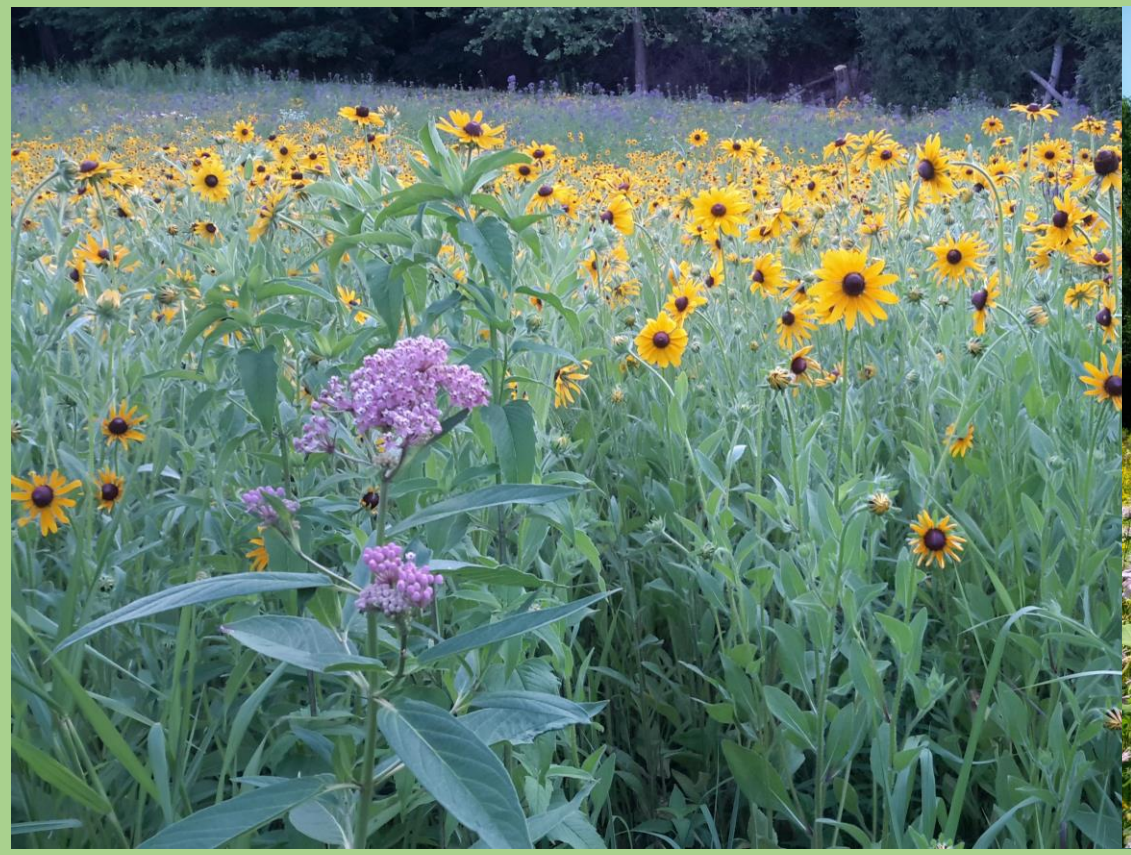
The order of moths and butterflies is called Lepidoptera. There are 11,500 species of lepidopterans in North America and they represent 50% of all insect herbivores here. Their caterpillars are important source of diets for many birds.

Credit- Bringing Nature Home, Douglas W. Tallamy, 2015

WHY NATIVE PLANTS? CONTINUED…

- Greater number of plant species means more opportunities for animals to obtain their energy with minimal competition for resources
- Plants differ in their size, shape, soil, water, nutrient requirements and their leaf chemistry, thus supporting a variety of animal species with differing taste.
- In conclusion, if we want animals of higher trophic levels in our managed ecosystems, we must save their primary food source and as a consequence save ourselves.

WHY NATIVE PLANTS? CONTINUED…



It is our chance to preserve our land, our wild flora and fauna and consequently our own future generations.

WHY NATIVE PLANTS? CONTINUED…

Some of the flowering bushes native to New Jersey

Swamp Milkweed

Milkweeds are preferred by caterpillars, bees, moths, butterflies and hummingbirds.

Meadow Rue

It is easy to grow and flowers are attractive to butterflies. The plant is tolerant of deer grazing.

Coral Honeysuckle

It is easy to grow and a delight to butterflies, hummingbirds and other insects.

WHY NATIVE PLANTS? CONTINUED…

Some of the flowering bushes native to New Jersey

Butterfly Weed

Growing this will help the populations of some butterflies.

Bog Asphodel

This is an endangered plant, will grow well in wetlands.

Cardinal Flower

A favorite of hummingbirds and other insects.

Button Bush

Grows easily in wet areas

Sweet Pepperbush

Bloodroot

Turk's Cap Lily

Cow Wheat

WHY NATIVE PLANTS? CONTINUED…

Some of the trees native to New Jersey can be planted easily

Red Oak

River Birch

Black Spruce

Silver Bell

Flowering Dogwood

Tulip Tree

Hazel Alder

Red Maple

Sweet Gum

Eastern Hemlock

WHY NATIVE PLANTS? CONTINUED…

Native gardens look amazingly pretty and colorful, a boon to local birds, insects and human population.

South Brunswick Township

It has become almost critical to take steps to end this decline in our native flora and fauna and improve / save our local ecosystem.

We can create islands of native flowering plants and trees in our designated open spaces.

We can ‘change the world’ by changing what food is available for our local wildlife.

We must make people of our town aware of the crisis and motivate them to volunteer their time and energy to come and create such green havens.

South Brunswick Township….cont’d

What will it take?

Tasks attached to creating a native species tree clusters and meadow –

1. Designing the plant and tree clusters with easy maintenance in mind
2. Cleaning and preparing the land
3. Purchase of native wildflower seeds and tree saplings
4. Application of native seeds
5. Fencing saplings from deer invasion
6. Spot herbicide treatment of invasive species
7. Picking of seeds for next season
8. Annual meadow mowing

South Brunswick Township

Can we do this?

Talk to senior communities. Retirees are always looking for something purposeful to do in their spare time. Request them to volunteer some of their time to help plant. Gardening is therapeutic and such social engagements are beneficial to older generation.

Engage Environment Club from High School to participate in exchange of volunteer hours..

Request Boy Scouts and Girl Scout troops.

Engage general population of the township by using social media like Facebook and Mayor’s letter to residents to motivate.

Participation of people is necessary for the success of this or any such program.

South Brunswick Township

How can we pay for such an endeavor?

With a small budget of just about $500.00, we can start handing out packets of seeds of native flowers to residents this fall to plant in their yards for the seedlings to bloom coming spring.

We will need funds for seeds, cleanup of areas in open space to prepare land for sowing of seeds. Perhaps township has some funds and equipment that can be used.

Local businesses can be requested to donate some funds or equipment.

Look and apply for any available grants.

Request monetary support from township residents.

South Brunswick Township….cont'd

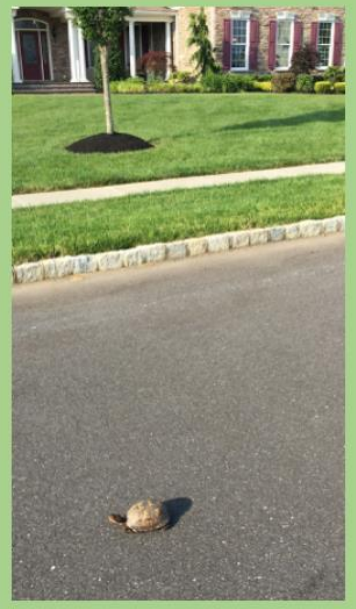
A few private agencies and non-profits have taken this challenge of creating native gardens. One such example is Non-Profit *Friends of Hopewell Valley Open Space* has partnered with the township of Hopewell and other government agencies to preserve the valley and restore the vegetation to its natural native haven.

https://www.fohvos.info/stewardship/native-plant-garden/

South Brunswick Township….cont'd

Preserving lands for native species of flora will have a very positive effect on our local environment. They will provide much needed food and shelter for our dwindling insect populations, which in turn will help the higher trophics like the birds, amphibians and others.

Quite a few species of turtles, frogs, reptiles and other animals live in these wetlands.



South Brunswick Township….cont’d

Several species of migrating birds land in this area. Saving these wetlands and enriching them with native flora will entice these birds to come here from year to year.

South Brunswick Township….cont'd

Where to find Native Plants and Trees near South Brunswick

- RareFind Nursery, 957 Patterson Rd, Jackson Township, NJ 08527. (732) 833-0613
- Calgo Gardens, 462 Adelphia-Farmingdale Road, Freehold, NJ 07728. (732) 919-7770
- Cicconi Farms Inc, 1005 Farmingdale Rd, Jackson Township, NJ 08527. (732) 363-1420
- Toadshade Wildflower Farm, 53 Everittstown Rd, Frenchtown, NJ 08825. (908) 996-7500
- Greenbelt Native Plant Center, 3808 Victory Blvd, Staten Island, NY 10314. (718) 370-9044
- Gasko's Family Farms, 112 Federal Rd, Monroe Township, NJ 08831. (732) 446-9205
- The Native Plant Nursery at Bowman's Hill Wildflower Preserve, 1635 River Rd, New Hope, PA 18938. (215) 862-2924
- Barton Nursery, 949 New Durham Rd, Edison, NJ 08817. (732) 287-5222

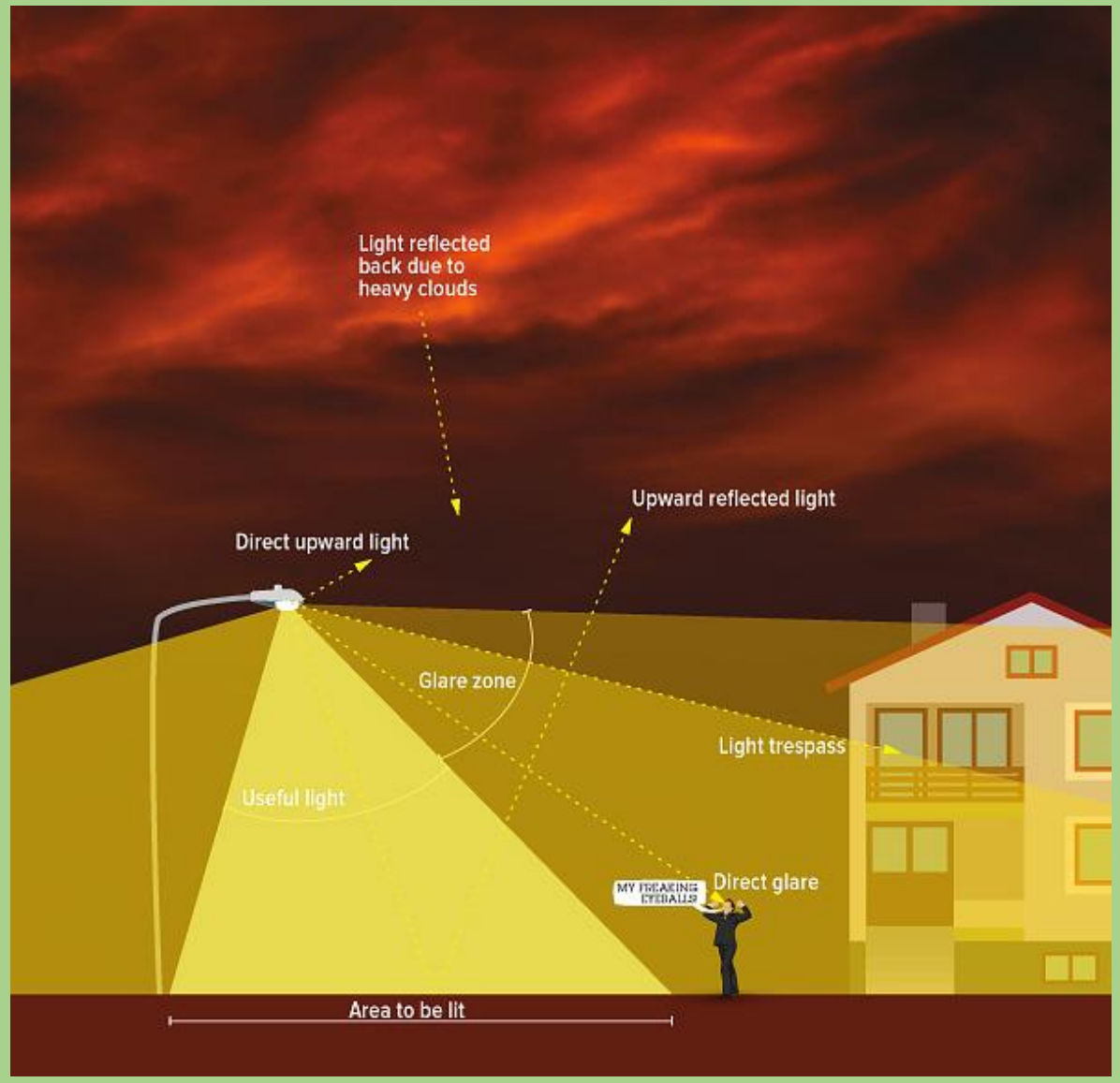
South Brunswick Township….cont'd

What is Light Pollution?

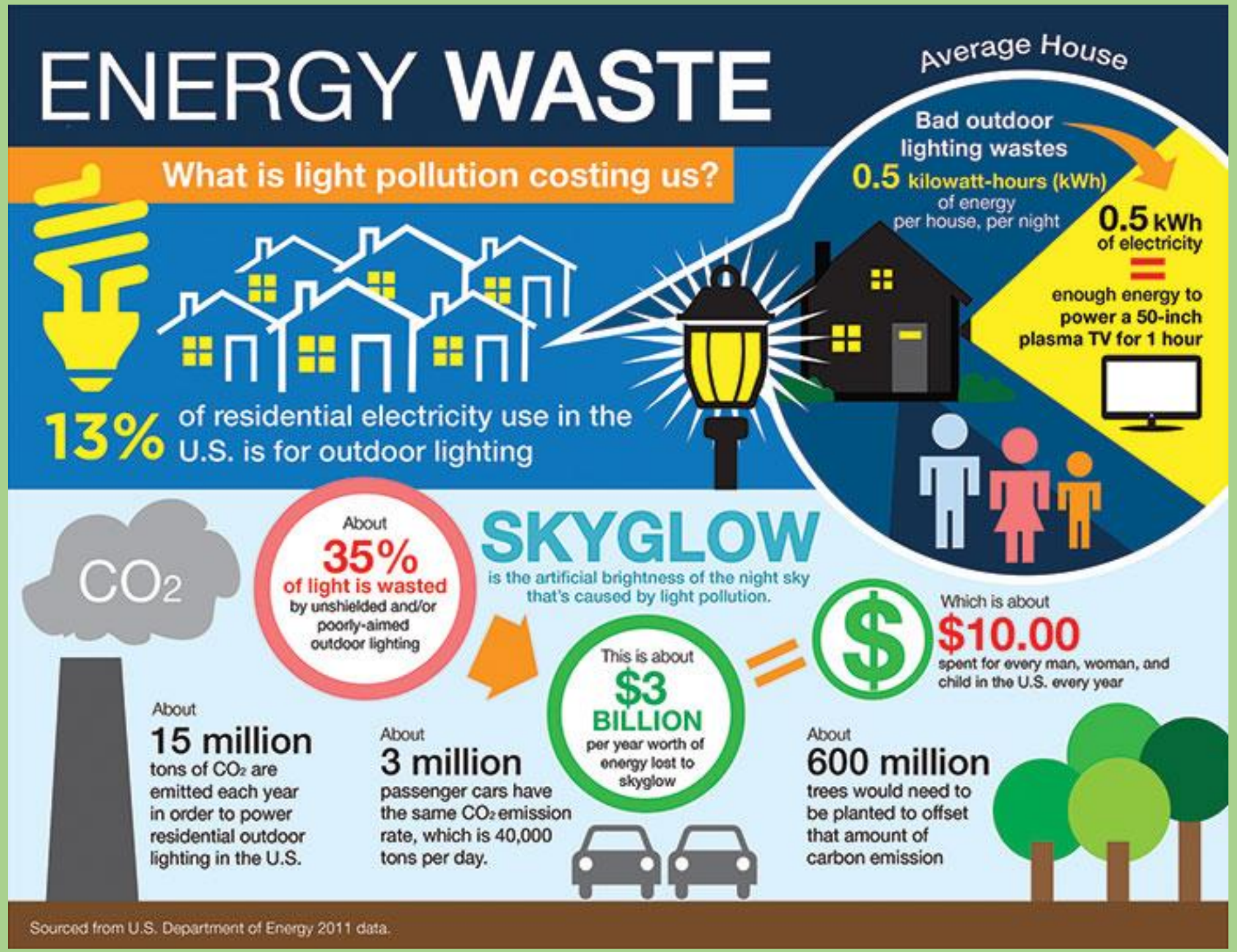
We are all familiar with air, water, and land pollution, but light is another pollutant that is having serious environmental consequences for humans, wildlife, and our climate.

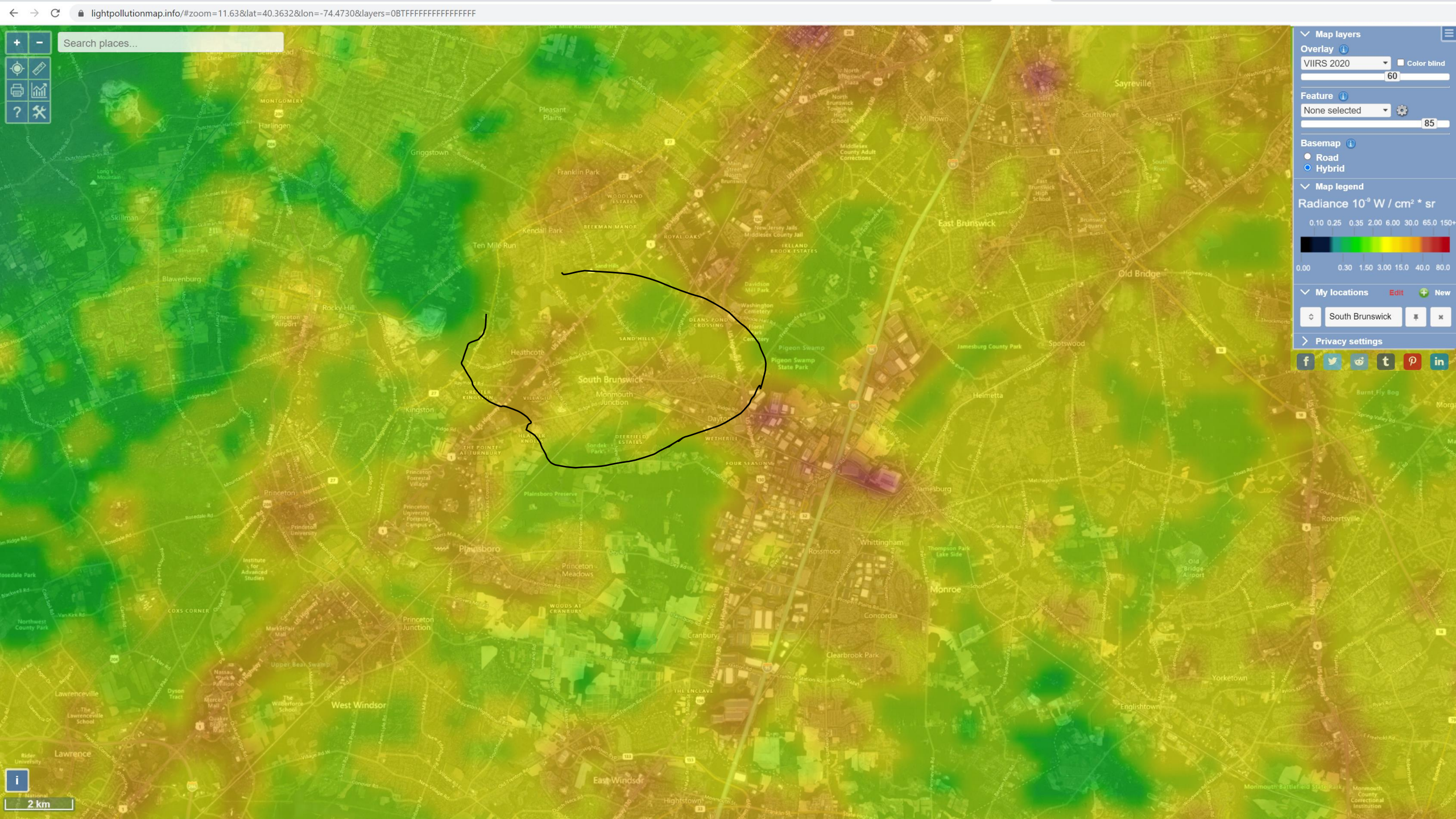
Light Pollution includes:

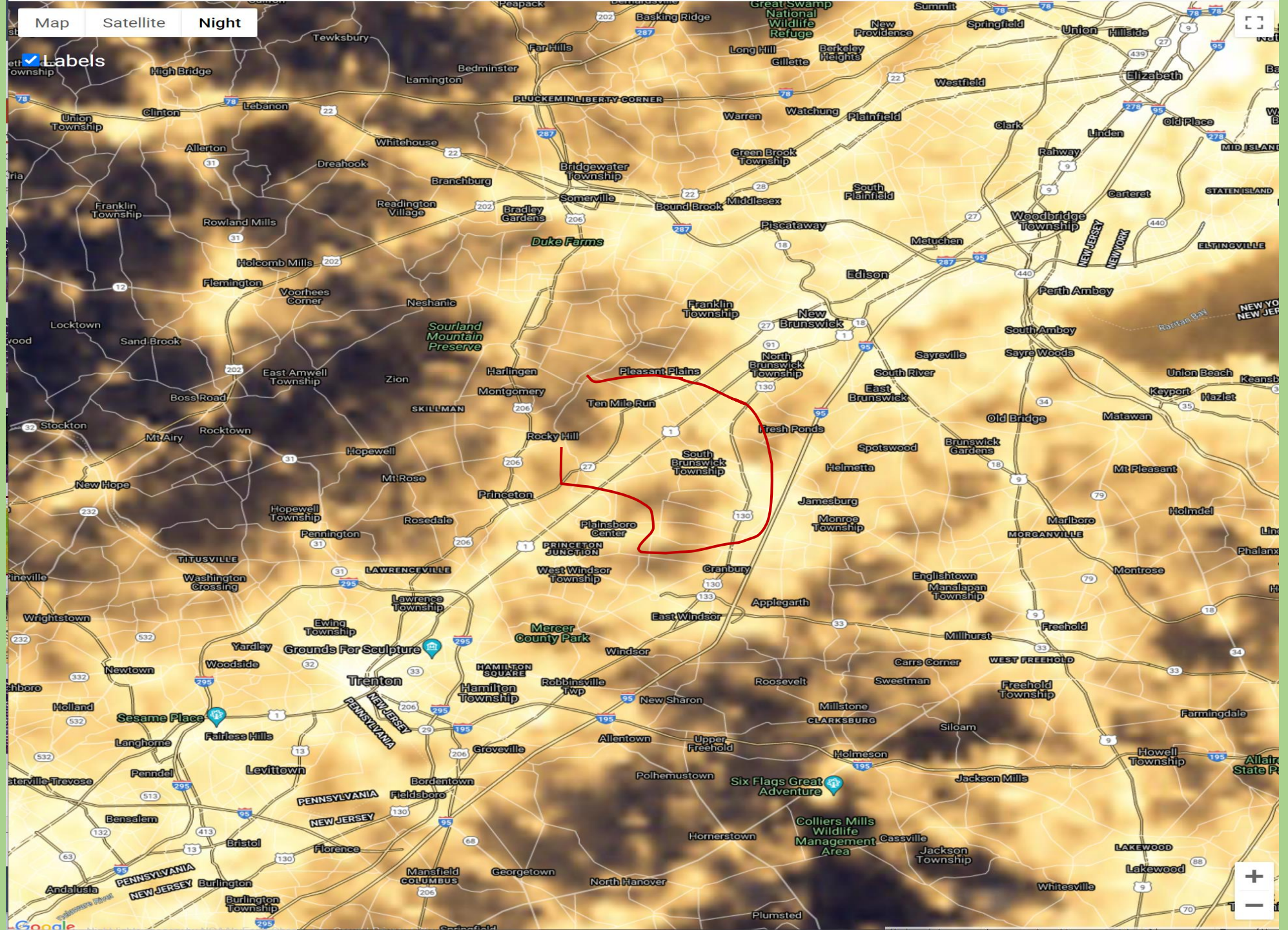
- **Glare** – excessive brightness that causes visual discomfort
- **Skyglow** – brightening of the night sky over inhabited areas
- **Light trespass** – light falling where it is not intended or needed
- **Clutter** – bright, confusing and excessive groupings of light sources



Before and during the 2003 Northeast blackout, a massive power outage that affected 55 million people. Photo by of Todd Carlson


ENERGY WASTE
What is light pollution costing us?
13% of residential electricity use in the U.S. is for outdoor lighting
Average House
Bad outdoor lighting wastes
0.5 kilowatt-hours (kWh) of energy per house, per night
0.5 kWh of electricity
=
enough energy to power a 50-inch plasma TV for 1 hour
CO2
About
35%
of light is wasted
by unshielded and/or poorly-aimed outdoor lighting
SKYGLOW
is the artificial brightness of the night sky that's caused by light pollution.
This is about
$3
BILLION
per year worth of energy lost to skyglow
=
$
Which is about
$10.00
spent for every man, woman, and child in the U.S. every year
About
15 million
tons of CO2 are emitted each year in order to power residential outdoor lighting in the U.S.
About
3 million
passenger cars have the same CO2 emission rate, which is 40,000 tons per day.
About
600 million
trees would need to be planted to offset that amount of carbon emission
Sourced from U.S. Department of Energy 2011 data.


lightpollutionmap.info/#zoom=11.63&lat=40.3632&lon=-74.4730&layers=0BTFFFFFFFFFFFFFFF
Search places...
Map layers
Overlay
VIIRS 2020
Color blind
60
Feature
None selected
85
Basemap
Road
Hybrid
Map legend
Radiance 10⁻⁹ W / cm² * sr
0.10 0.25 0.35 2.00 6.00 30.0 65.0 150+
0.00 0.30 1.50 3.00 15.0 40.0 80.0
My locations
Edit
New
South Brunswick
Privacy settings
South Brunswick
Monmouth Junction
Heathcote
Kendall Park
Ten Mile Run
Franklin Park
Griggstown
Pleasant Plains
Harlingen
Skillman
Blawenburg
Rocky Hill
Princeton
Plainsboro
Princeton Junction
West Windsor
Lawrenceville
Lawrence
Kingston
Dayton
Jamesburg
East Brunswick
Old Bridge
Sayreville
Monroe
Helmetta
Spotswood
East Windsor
Hightstown
2 km


Map
Satellite
Night
Labels
Tewksbury
Basking Ridge
Great Swamp National Wildlife Refuge
Summit
Springfield
Union
Hillside
New Providence
Far Hills
Long Hill
Berkeley Heights
Gillette
Elizabeth
Westfield
High Bridge
Bedminster
Lamington
PLUCKEMIN
LIBERTY CORNER
Clinton
Lebanon
Union Township
Warren
Watchung
Plainfield
Clark
Linden
Old Place
Rahway
Whitehouse
Allerton
Dreahook
Branchburg
Bridgewater Township
Green Brook Township
South Plainfield
Carteret
STATEN ISLAND
Franklin Township
Readington Village
Somerville
Bradley Gardens
Bound Brook
Middlesex
Rowland Mills
Duke Farms
Piscataway
Woodbridge Township
NEW JERSEY
NEW YORK
ELTINGVILLE
Holcomb Mills
Metuchen
Edison
Flemington
Voorhees Corner
Neshanic
Perth Amboy
Franklin Township
New Brunswick
Locktown
Sand Brook
Sourland Mountain Preserve
South Amboy
Sayreville
Sayre Woods
East Amwell Township
Zion
Harlingen
Pleasant Plains
North Brunswick Township
South River
Union Beach
Keansb
Boss Road
Montgomery
Ten Mile Run
East Brunswick
Keyport
Hazlet
SKILLMAN
Old Bridge
Matawan
Stockton
Rocktown
Mt Airy
Rocky Hill
Fresh Ponds
Spotswood
Brunswick Gardens
Hopewell
South Brunswick Township
Helmetta
Mt Pleasant
New Hope
Mt Rose
Princeton
Jamesburg
Hopewell Township
Rosedale
Monroe Township
Marlboro
Holmdel
Plainsboro Center
MORGANVILLE
Pennington
PRINCETON JUNCTION
TITUSVILLE
LAWRENCEVILLE
West Windsor Township
Cranbury
Englishtown
Manalapan Township
Montrose
Washington Crossing
Lawrence Township
Applegarth
Wrightstown
Ewing Township
East Windsor
Freehold
Mercer County Park
Millhurst
Yardley
Grounds For Sculpture
Windsor
Woodside
Carrs Corner
WEST FREEHOLD
Newtown
HAMILTON SQUARE
Trenton
Roosevelt
Sweetman
Robbinsville Twp
Hamilton Township
Freehold Township
Holland
New Sharon
Millstone
CLARKSBURG
Sesame Place
Siloam
Farmingdale
Fairless Hills
Langhorne
Allentown
Upper Freehold
Groveville
Holmeson
Howell Township
Penndel
Levittown
Polhemustown
Six Flags Great Adventure
Jackson Mills
Bordentown
PENNSYLVANIA
Fieldsboro
NEW JERSEY
Bensalem
Colliers Mills Wildlife Management Area
Hornerstown
Cassville
Jackson Township
LAKEWOOD
Bristol
Florence
Lakewood
Andalusia
Burlington
Mansfield
COLUMBUS
Georgetown
North Hanover
Whitesville
Burlington Township
Plumsted
Google

Effects of Light Pollution

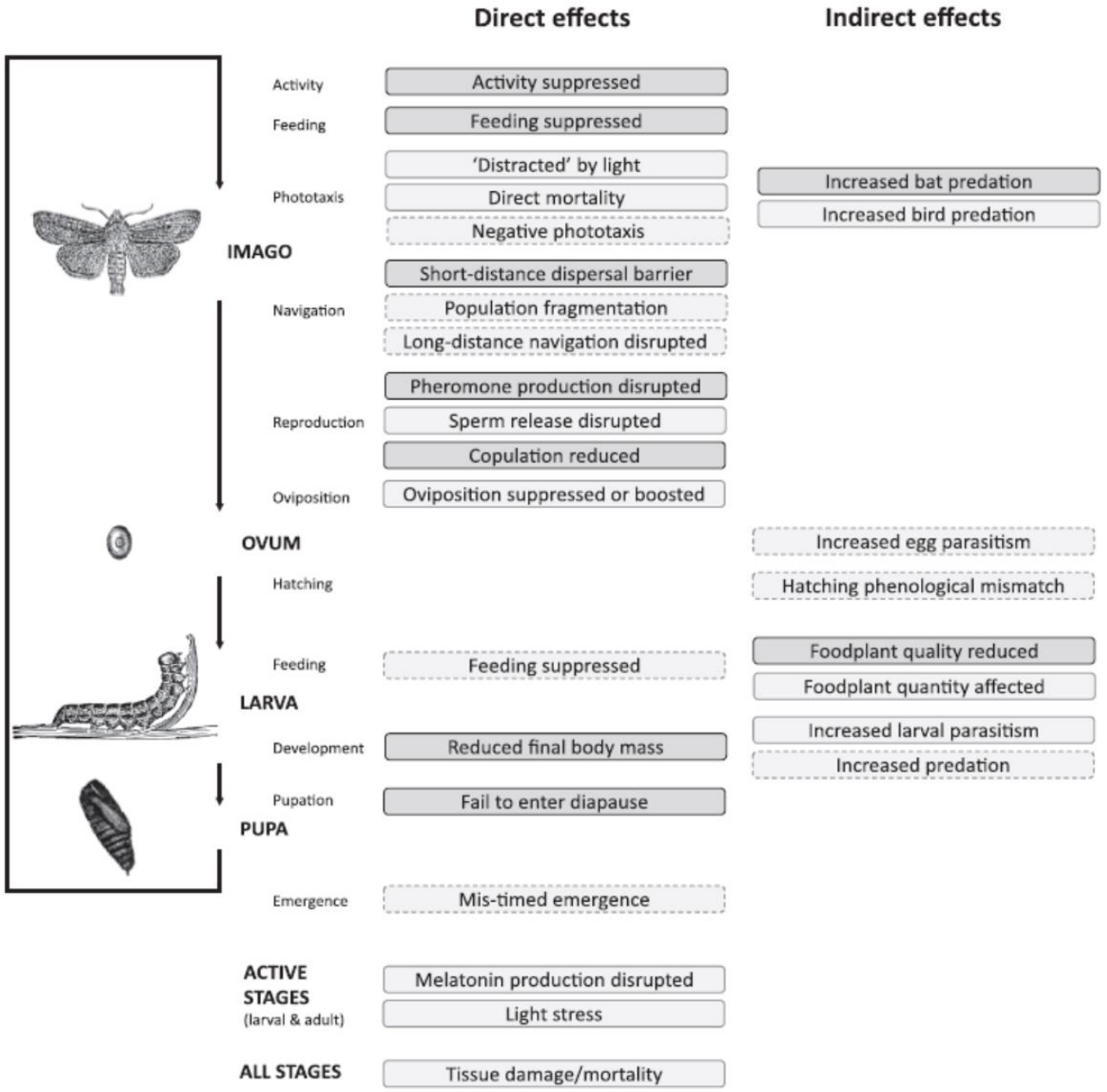
Life has existed on our planet in a diurnal/nocturnal rhythm for about three billion years.
Now the nighttime darkness has been overpowered by artificial lights, disrupting the day/night pattern and harming the delicate balance of the environment.

Artificial lights –

- **Increase our energy consumption**
- **Disrupt the world's ecosystems –** Nocturnal animals sleep during the day and forage in the night. Light pollution where now night times are hundreds of times more brighter than just a century ago and has radically altered their nighttime environment. Glare from artificial lights has impacted wetland habitats like those we have in Monroe that are home to amphibians such as frogs, and toads, whose nighttime croaking is part of the breeding ritual. Artificial lights disrupt this nocturnal activity, interfering with reproduction and reducing populations.
- **Artificial Lights have Devastating Effects on Many Bird Species** - Birds hunt or migrate during the night using moonlight and starlight to navigate. Artificial light causes them to fly off course. Every year millions of birds die colliding with needlessly illuminated buildings. Migratory birds depend on cues from properly timed seasonal schedules. Artificial lighting causes them to miss ideal climate conditions for nesting and foraging.

Everything is Connected

Many insects are drawn to light and artificial lights create a fatal attraction. Declining insect populations negatively impact all species that rely on insects for food or pollination. Some predators exploit this attraction to their advantage, affecting food webs in unanticipated ways.


Direct effects
Indirect effects
Activity
Activity suppressed
Feeding
Feeding suppressed
'Distracted' by light
Phototaxis
Direct mortality
Increased bat predation
Increased bird predation
Negative phototaxis
IMAGO
Short-distance dispersal barrier
Navigation
Population fragmentation
Long-distance navigation disrupted
Pheromone production disrupted
Reproduction
Sperm release disrupted
Copulation reduced
Oviposition
Oviposition suppressed or boosted
OVUM
Increased egg parasitism
Hatching
Hatching phenological mismatch
Feeding
Feeding suppressed
Foodplant quality reduced
Foodplant quantity affected
LARVA
Increased larval parasitism
Development
Reduced final body mass
Increased predation
Pupation
Fail to enter diapause
PUPA
Emergence
Mis-timed emergence
ACTIVE STAGES
(larval & adult)
Melatonin production disrupted
Light stress
ALL STAGES
Tissue damage/mortality

South Brunswick Environment and Shade Tree Commissions can help in the following ways:

- Work with the township council to help the council architect light pollution reducing ordinances.
- Help educate the township residents on the negative and undesirable effects of light pollution.
- Engage communities surrounding open spaces to take charge of planting and upkeep of the native plant islands with the help of township authorities.

South Brunswick residents can help in the following ways:

- Full cutoff shielding of outdoor light fixtures (prevent upward glare).
- Use minimum light needed for the task at hand.
- Shut off or reduce lighting levels when an area is not in use.
- Use amber-yellow LED lamps outdoors, eliminate blue-tinted lights.
- Support preservation of open space and native plant habitat.
- Increase the number of native pants and wildflowers on your property.

Let’s take a multipronged approach to saving our fragile ecosystem:

- Educate residents to use less insecticides, pesticides, fertilizers and other chemicals.
- Use more eco-friendly products in and around our homes.
- Plant native tree, shrub and flower species to help native insect and other wildlife populations in open spaces and individual yards.
- Control light pollution to allow wildlife to preserve their circadian rhythms.
- Use the volunteering power of our residents to achieve these goals quickly as the crisis is mounting before our eyes..

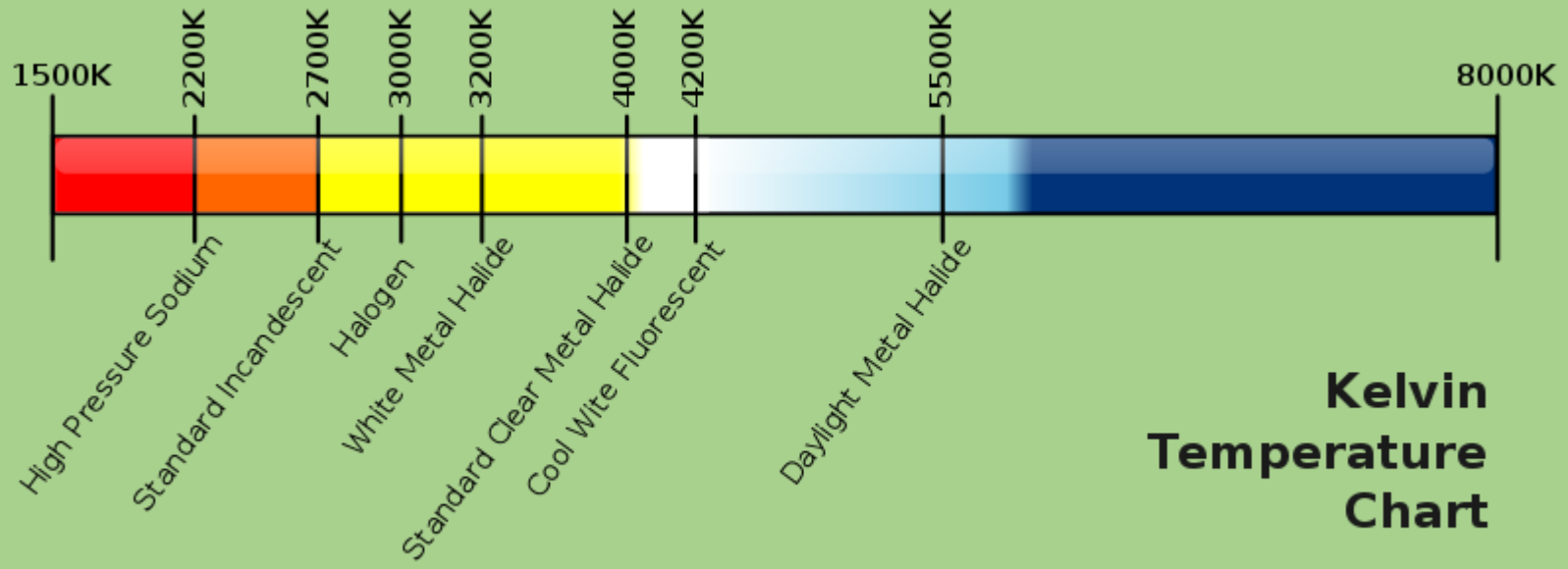
Choosing the Right Bulb

In the picture on the left, the bulb on the left is rich in high-color temperature blue light, while the one on the right isn't.

All packaging for new CFL and LED light bulbs provide color temperature information. Townships must low color temperature light sources for interior and exterior light. Their light is less harsh and less harmful to human health and the environment.

Warm white sources with a color temperature of 3000K or lower are less harmful.

The Kelvin temperature chart (right) shows what the numbers mean.
Higher color temperatures mean bluer light, the kind that should be avoided after dusk.



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https://blue-marble.de/nightlights/2012
https://www.lightpollutionmap.info/help.html

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- http://www.npsnj.org/PDFs/articles/Native%20Plants%20for%20Wet%20Places.pdf
- Bringing Nature Home, Author Douglas W. Tallamy