

Dedicated light recipes

to ensure comfort for both
nature and people



PHILIPS

Contents



The world is becoming
brighter



Meeting the needs
of all inhabitants
during the night



The right light
can help



Light recipes



Product options



Remote light
management

The world is
becoming
brighter



The world is becoming brighter

As the world continues to develop, it needs more light.

Urban populations are growing particularly rapidly, increasing the need for light.

We are becoming a 24/7 society, so basic infrastructures need to be available all the time.

Due to its obvious advantages like high efficiency and low maintenance, LED is becoming the preferred light source.

Lighting has a fundamental role in providing greater visibility, increased safety, and ensuring smooth mobility.

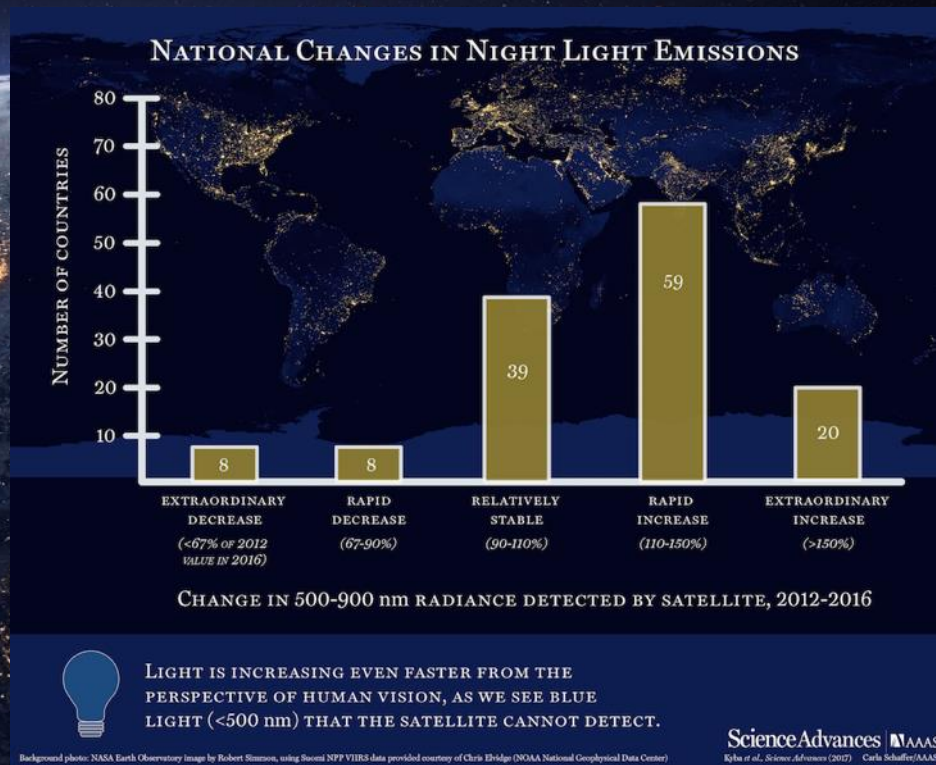
But...

Source: <https://www.space.com/38872-light-pollution-increasing-globally.html>

Night-time light emissions are increasing

This illustration shows the number of countries experiencing a rapid increase in night-time light emissions, as detected by satellite, 2012-2016.

Credit: Kyba et al. / Science Advances

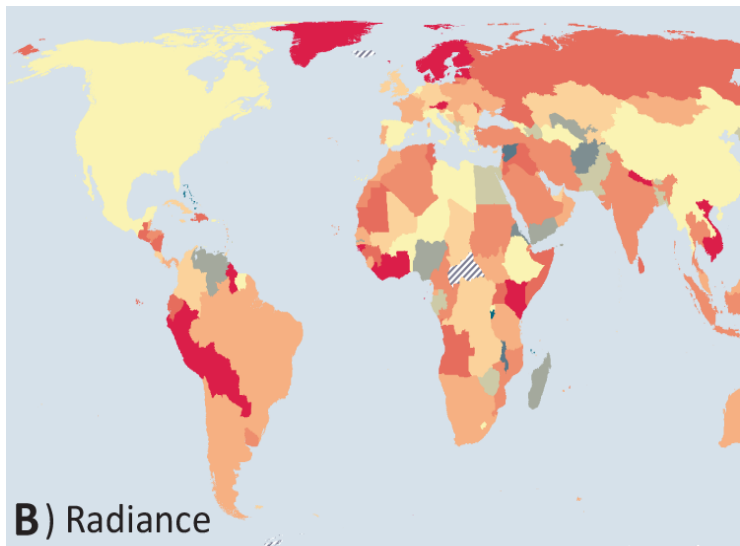
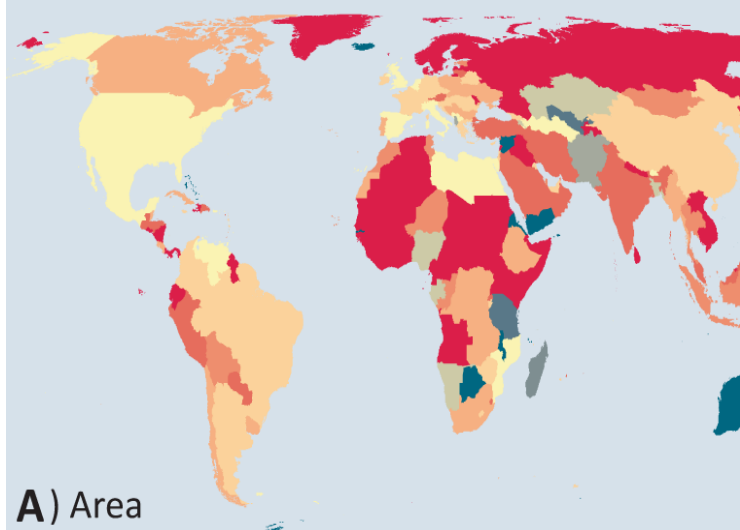


Night-time brightness is increasing at a fast pace

Satellite images show that there is more artificial light at night across the globe, and that light at night is getting brighter.

The rate of growth is approximately two percent each year in both the number of areas lit (Fig A) and the radiance of the light (Fig B). Warmer colors correspond to higher rates of change.

Credit: Kyba et al. / Science Advances



Poor quality LED lighting can have **negative consequences**



It can be a **nuisance for residents**. Glare can cause discomfort for people relaxing in their homes or walking on the streets at night.



It can turn areas of cities into unwelcoming spaces, **negatively impacting tourism**.



It can **increase light pollution** and sky glow, preventing people from enjoying the stars and a clear sky.



It can have a **negative impact on biodiversity** by disturbing various species of birds, bats and other animals.

Outdoor lighting has
to meet the needs of all
**inhabitants
of the night**



Lighting for different needs

- For people living in towns and cities, lighting needs to provide **safety** and **comfort**.
- At the same time, it's important to **care for every living creature** on the planet and protect them from extinction.
- Bats and other animals also play an important role in the well-being of people and as essential components of a **livable, sustainable environment**.
- If **lighting can help achieve these goals**, it should be optimized to do so.

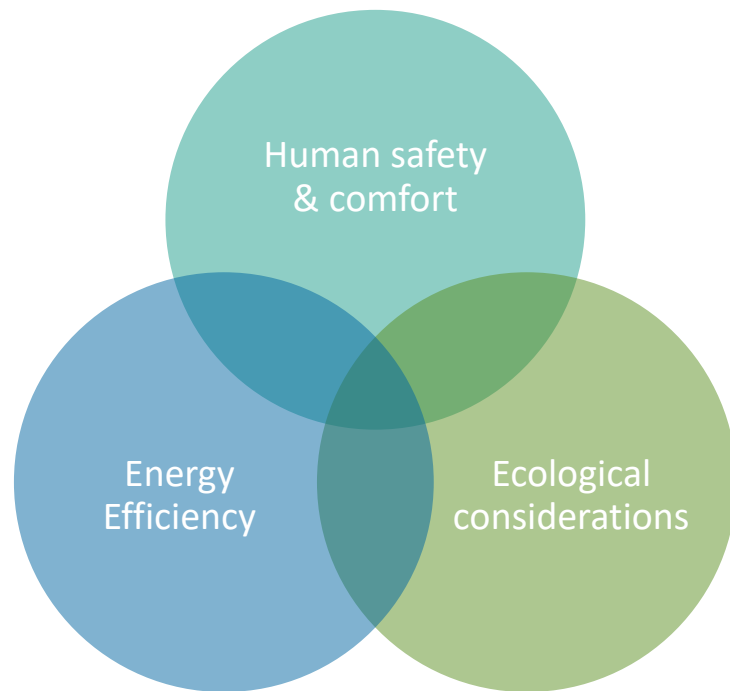


Optimal lighting requires a balance

To obtain optimal lighting, the balance has to be maintained between:

- **Safety and comfort for people**
- **Energy efficiency**
- **Ecological considerations**

The overall aim is to create a safe and sustainable environment with minimal energy consumption and the least possible disturbance to birds, bats and other animals.



The right light
can help



With the right light you can ...

1.

Preserve a clear
night sky



2.

Provide optimal
ecosystems for bats



We have carried out extensive research in collaboration with well-known universities. We have developed dedicated light recipes that help **make spaces more livable for people**, and **do not disturb the natural rhythms of nocturnal species like bats**.

2.

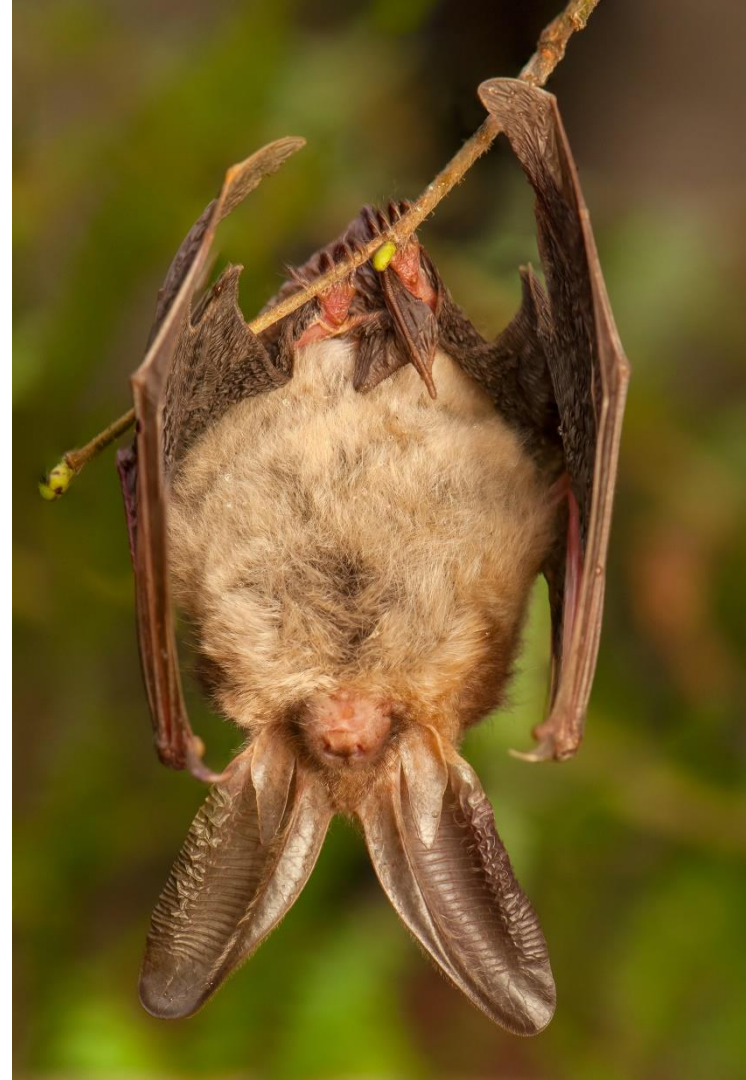
Provide optimal
ecosystems for bats



Why conserve bats?

Bats are highly beneficial mammals:

- Control and reduce numbers of **potentially irritating or harmful insects**.
- Highly effective in controlling **agricultural pests** as they **reduce the need for pesticide sprays**
- Robust **natural indicators of environmental health** as **changes** in bat populations indicate changes in aspects of biodiversity



Bat protection across the EU

- The **Habitats Directive** published by the European Union covers all bat species living in the area of the EU.
- Its overall objective is to **maintain and restore the natural habitats and species** of wild fauna and flora that are of community interest.
- The Directive requires all Member States to undertake positive measures to ensure their **populations reach a favorable conservation status**.



Where do bats live?

Virtually everywhere!

Locations with a high density of insects

- Close to water, amongst trees

Locations that provide shelter

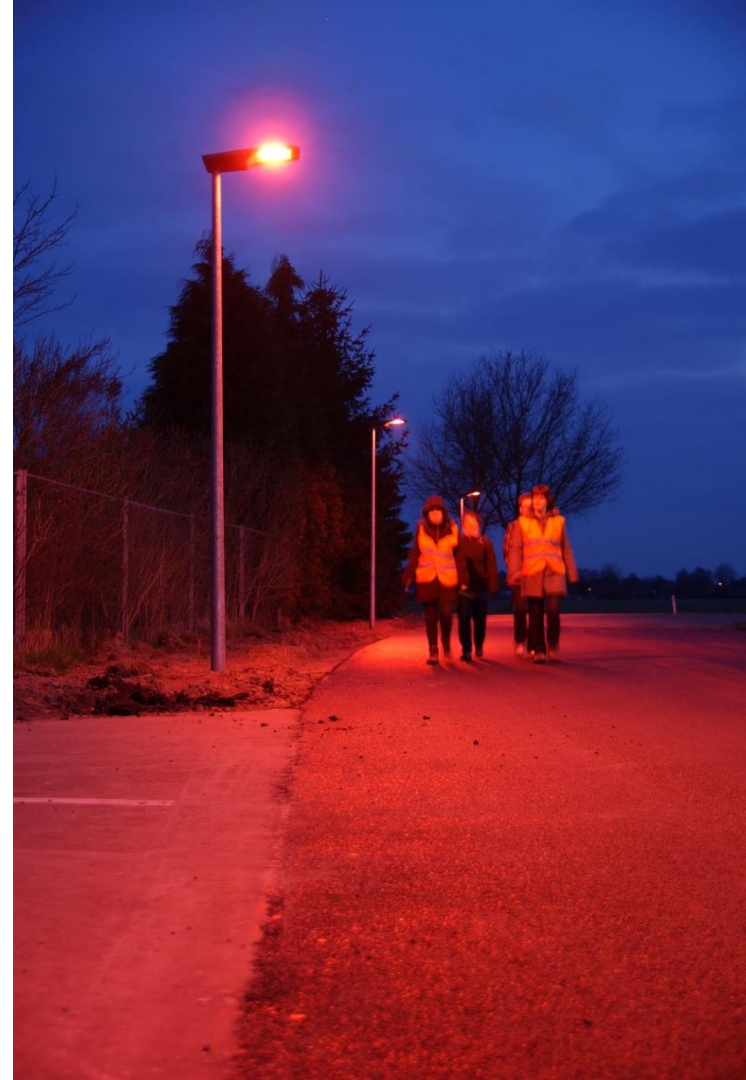
- Trees, buildings, caves

Specific areas

- National parks
- Ecological development projects

Peri-urban areas

- Growing in significance

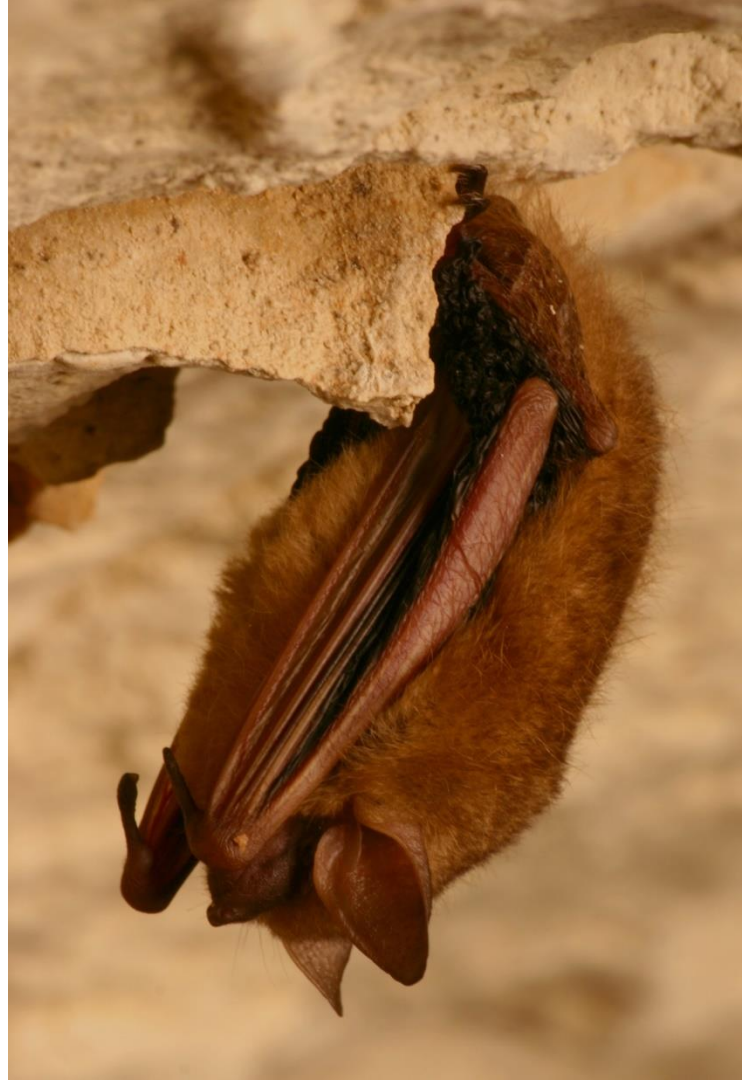


Bats and artificial light

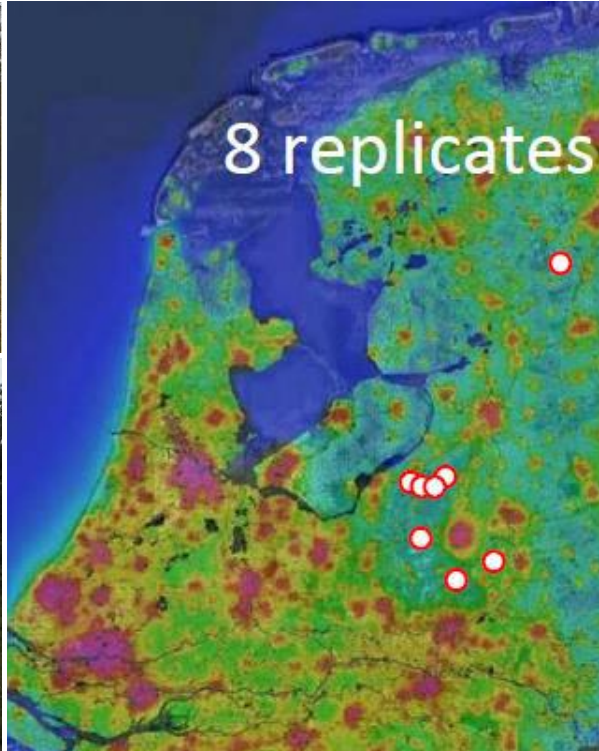
Artificial light negatively influences some bat species

- (In)direct effects on **maternity colonies**, **hibernation sites** and **roosts**.
- Effects on **commuting routes** as **lit roads** can act a **sort of border** they cannot/don't dare to cross
- Increases **risk of predation**.

White light LEDs have been shown to stop slower flying species drinking at cattle troughs, and even faster flying species drinking behavior was reduced



7 year research on 8 different sites



research



funding



support



terrain



NGO's



Research in the field

- A study tested the response of **three species of bat** to **three different experimental light spectra** in an otherwise **dark and undisturbed natural habitat**.
- At eight sites in the Netherlands, **light posts were set up**.
- The light posts emitted either **white light** and **two different light recipes**.
- One control area was left dark.
- A nominal flux of **1800 lumen** and **7.6+1.2 Lux** (1 s.e.m.) at ground level was applied.
- The lights were on from **sunset to sunrise** throughout the year.
- Recordings were made on 54.4 ± 3.8 nights per site.



Research in the field

Dark (control)



White



Light recipe 1



Light recipe 2

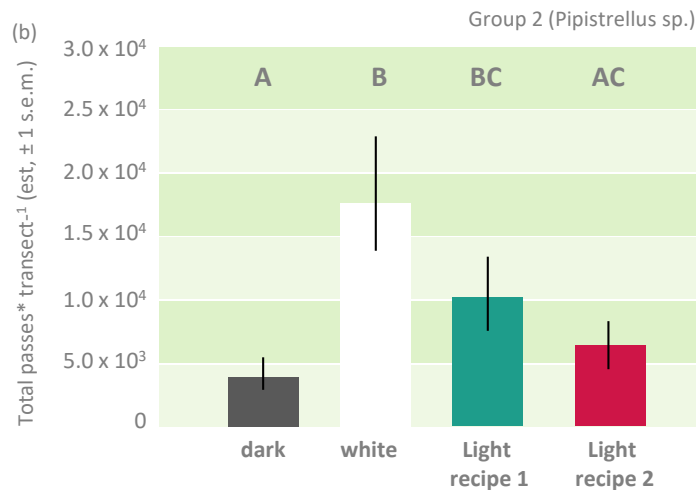
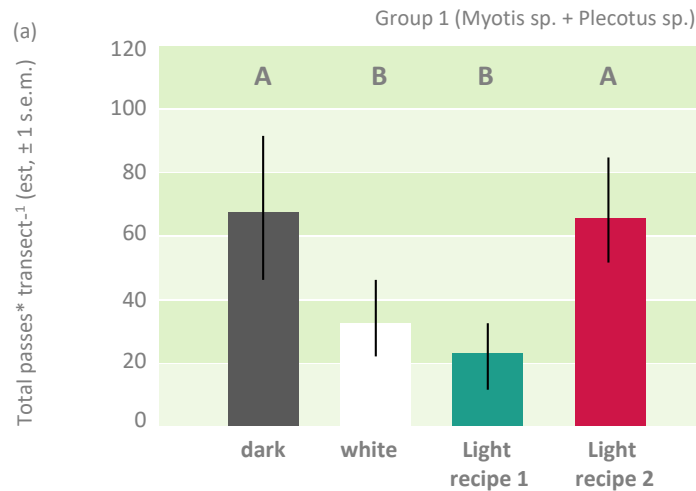


Research Results

Group 1: *Myotis* and *Plecotus*. These species **generally try to avoid lighting** as much as possible. Therefore, lighting can be a **serious obstacle to feeding**.

Group 2: *Pipistrellus*. These species are attracted by the insects that are drawn to light. Lighting in itself is not harmful for this type of bat, but artificial lighting disturbs the ecosystem, by giving certain species advantages over others.

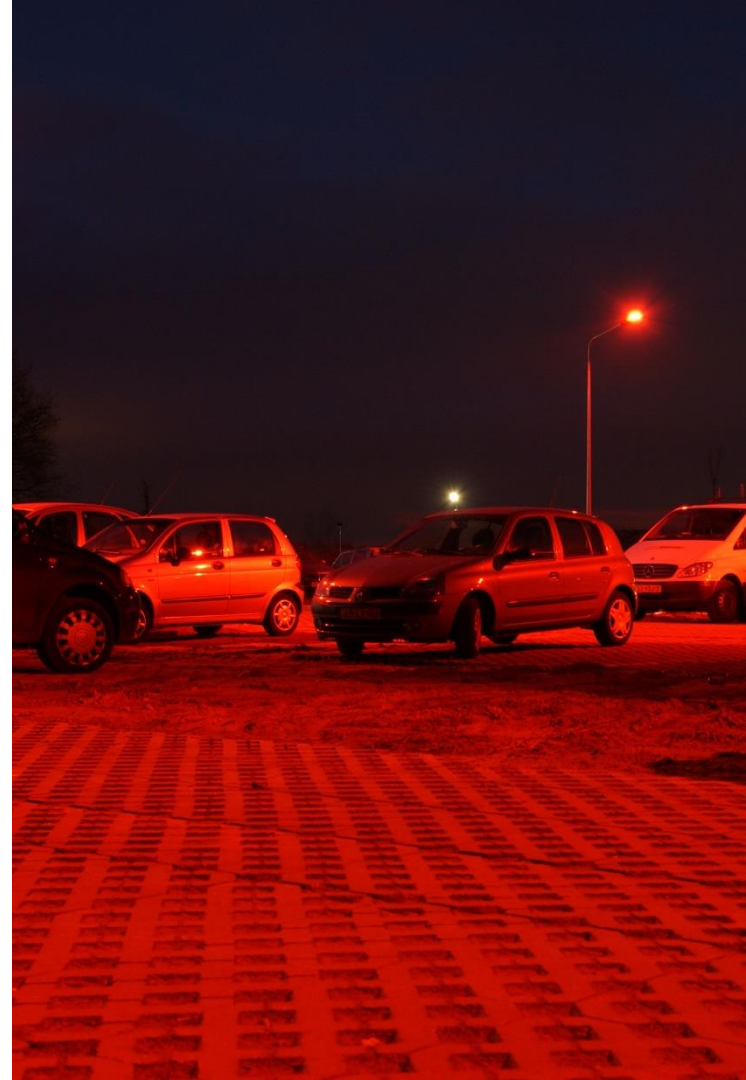
Group 3: *Nyctalus* and *Eptesicus* are not significantly impacted by light.



Ideal lighting conditions for bats

- There is a common belief that bats are not impacted at light levels below 1 lux with 3000K and 2.5 lux for amber.
- This appears not to be true.
- Bats are still impacted by these light levels, which can be a serious obstacle to feeding, or disturb the ecosystem by benefiting certain species over others

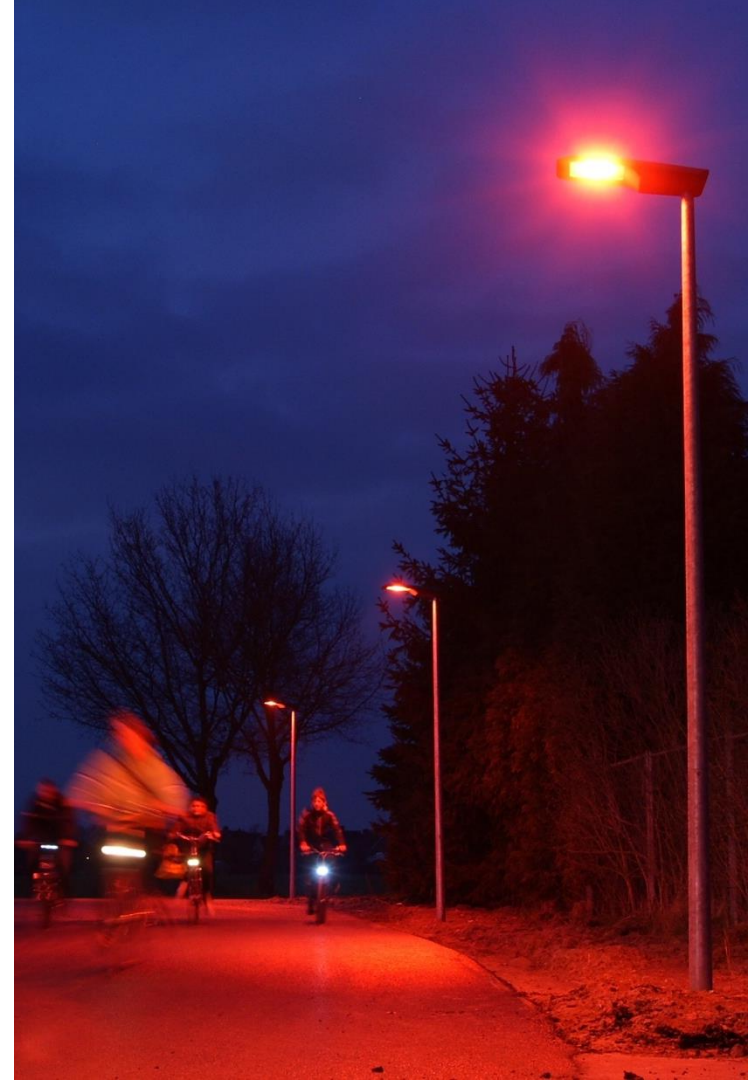
Research by Signify and the German Max Planck Institute for Ornithology, Seewiesen (submitted for publication)



The right lighting

Optimized light spectrum for bats

- In line with research findings, a new light spectrum was **designed for animals that are distracted by short wavelength light.**
- It displays **minimal attraction for insects.**
- Bats behave the same way as it was full darkness around them therefore **it helps maintain the balance of the ecosystem** by providing equal opportunities
- **Lit roads don't act as borders or obstacles to be crossed during night time**
- For *Myotis* bats it is **equivalent to darkness.**
- **People have sufficient light** to operate or drive safely.



Success story: Zuidhoek, the Netherlands

- Thanks to its rare and special flora and fauna, Zuidhoek in the municipality of Nieuwkoop is part of the Natura 2000 Program.
- The municipality decided to turn an old camp site into a residential area, but prior to construction work starting, they were obliged to conduct a flora and fauna research.
- They learned that it is an important feeding area for some rare bat species, **so had to put some conservation measures in place, also relating to lighting**
- They had to apply a light source that would not disturb the nocturnal feeding activity of the bats and upon meeting the criterion, they were allowed to go ahead with the housing program



Success story: **Zuidhoek, the Netherlands**

- The municipality selected the dedicated Philips light recipe developed for bats.
- Thanks to its special spectrum, the lighting is suitable for bats while ensuring sufficient illumination for the area's residents.
- Currently in Zuidhoek this is the only light source used to ensure that wildlife is not impacted by the housing program.



Light Recipes



Why Light Recipes?



To **protect livable spaces** for people as well as natural habitats for birds and bats.



Concepts can be easily realized with **existing lighting infrastructures**.



Proven and reliable technology that will still deliver on the basic promises of LED.



Actions need to be taken, and it's **worth the learning experience** to ensure a livable tomorrow.

Light Recipes

Preserve a clear
night sky



Provide optimized
ecosystems for bats



Product options



Product options

interact
ready.

Preserve a clear
night sky



ClassicStreet



Villa LED



Harmony LED



Quebec LED



DigiStreet



Luma



ClearWay gen2



Lumi/UniStreet

Optics	DN10	DM11	DM50	DW10	DW50	DX10	DS50	DSM1	DX60
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Product options

Provide optimized ecosystems for bats



DigiStreet



Lumi/UniStreet

Optics	DN10	DM11	DW10	DX51
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interact
ready.

Remote light management



Lighting to reflect city life: Remote light management

Advanced lighting system and software applications help you get greater control over your lighting infrastructure and among others ensure there is only light when and where it's needed.

Software applications like Interact City let you create dimming calendars that work well in different seasons or help you adopt the lighting for different events. It also gives you the option to connect existing and upcoming sensor applications to the lighting grid, thereby enabling you to make use of innovations that make your city not only smarter but also more livable.

interact
ready.



