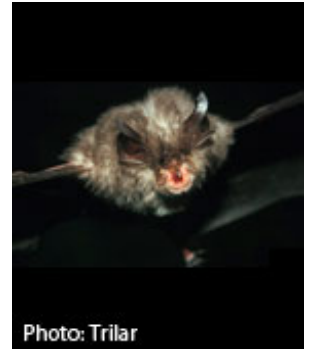




Life at Night - Improving the conservation status of nocturnal animals (moths and bats) by reducing the effect of artificial lighting at cultural heritage sites.

LIFE09 NAT/SI/000378



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#### Project description:

##### Background

Light pollution is becoming an increasingly significant problem that affects a large number of species. Many nocturnal animals are attracted to artificial lights, which confuses their orientation and often induces endless repetitive circling around light sources. Such behavioural changes can increase susceptibility to predators, affect reproduction, disrupt migration, disturb circadian rhythms and result in mortality due to collision or exhaustion. The effects of light pollution on biodiversity are still not widely understood, but studies have demonstrated its negative impact on insects, bats, birds, turtles, amphibians and a number of other animals. While a lot of actions have focused on streetlights, problems associated with illuminated sites of cultural importance remain largely unaddressed. This issue represents a special challenge as such illumination typically comes from below and emits towards the sky, resulting in large bright areas in the nightscape. As a result, illuminated buildings or monuments are visible to terrestrial and aerial animals.

##### Objectives

The overall objective of the Life at Night project was to improve the conservation status and biodiversity of nocturnal animals at selected areas by reducing the negative effects of artificial lighting produced by the illumination of cultural

heritage sites. The project also aimed to draw up technical guidelines for energy-efficient and environmentally friendly illumination of cultural heritage sites and to promote their use at national and EU level. The project moreover planned to design a light source that can be specifically adjusted to block the light that would otherwise be emitted towards the sky. The light source would emit less light, have a blind adjusted to the shape of the building that prevents light loss, and be more energy efficient. The beneficiary planned to manufacture and test a prototype of this newly designed custom-made light source on selected churches. It also monitored the impact of different light sources on the conservation status and biodiversity of two groups of nocturnal animals that are strongly affected by light pollution: bats and moths.

## Results

The project reached its main objective of improving the conservation status of nocturnal animals – moths and bats – by reducing the effect of artificial lighting on selected churches through the use of a method that can be applied at all illuminated cultural heritage sites. It produced robust results that demonstrate the influence that different luminary intensity and wavelengths have on moths and bats.

More specifically, the project demonstrated the benefits of using less powerful and yellow-coloured bulbs. By using these lights, 5.8 times fewer specimens and 3.9 times fewer species of moths were observed on the facades on the project sites than there would have been present by using the original lighting. Also, 21 times fewer dead insects were found under the light sources. These figures confirm that change in lighting is positive not only for moths but for insects in general. The project results have implications for several Slovenian national conservation policies.

Furthermore, the innovative light solution offers substantial energy saving and is easily achievable with carefully selected bulbs. Calculations showed that the overall electricity savings range from 40 to 90% per church.

The project results were shared on national and international level at workshops and conferences to encourage general public to consider the impact of light pollution on biodiversity. The project team mobilised a wide range of stakeholders to further spread the dark sky approach and its benefits for animals active at night such as bats and moths.

Further information on the project can be found in the project's layman report and After-LIFE Conservation Plan (see "Read more" section).

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Environmental issues addressed:

Themes

Species - Mammals

## Keywords

biodiversity, cultural heritage, environmental impact of energy

## Target EU Legislation

- Nature protection and Biodiversity
- Directive 92/43 - Conservation of natural habitats and of wild fauna and flora- Habitats Directiv ...

## Target species

Rhinolophus hipposideros

## Natura 2000 sites

SCI	SI3000013	Vrzdenc
SCI	SI3000016	Zaplana
SCI	SI3000017	Ligojna
SCI	SI3000019	Nemki Rovt
SCI	SI3000034	Banjice - traviča
SCI	SI3000118	Boč - Haloze - Donačka gora
SCI	SI3000225	Dolina Branice
SCI	SI3000255	Trnovski gozd - Nanos
SCI	SI3000256	Krimsko hribovje - Meniija
SCI	SI3000270	Pohorje
SCI	SI3000276	Kras

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## Beneficiaries:

Coordinator	Euromix d.o.o.
Type of organisation	SME Small and medium sized enterprise
Description	Euromix is a small private company that specialises in the production of measuring equipment for lighting.
Partners	University of Ljubljana-Biotechnical faculty, Slovenia Baza Media 2.1 Ltd., Slovenia Društvo za proučevanje in ohranjanje metuljev Slovenije (Society for the conservation and study of Lepidoptera), Slovenia Slovensko društvo za proučevanje in varstvo netopirjev (Slovenian

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Administrative data:

Project reference	LIFE09 NAT/SI/000378
Duration	01-SEP-2010 to 28-FEB -2014
Total budget	596,280.00 €
EU contribution	294,393.00 €
Project location	Osrednjeslovenska(Slovenia Slovenija)

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Read more:

Leaflet	Title: Project's leaflet Year: 2011 Editor: Life at Night project No of pages: 4
Project web site	<a href="#">Project's website</a>
Publication: After-LIFE Communication Plan	Title: After-LIFE Communication Plan Year: 2014 No of pages: 9
Publication: Guidelines-Manual	Title: "Nature-friendlier lighting of objects of cultural heritage (churches) - Recommendations" Author: A. Mohar, M. Zagamjster, R. Verovnik, B. Bolta Ska Year: 2014 Editor: Dark-Sky Slovenia No of pages: 29
Publication: Layman report	Title: Layman report Author: B. Bolta Skaberne, M. Zagamjster, R. Verovnik No of pages: 16
Video link	<a href="#">"Life at night" (29.24')</a>

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