

# **SOS call from nature: Observing effects of artificial night lighting on marine birds on the Azores**

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**10<sup>th</sup> European Symposium for the Protection of the Night Sky  
Kaposvár, Hungary – September 2010**

## **ABSTRACT**

Ongoing global human development entails a considerable increase in artificial lighting, both in terms of spatial extent and intensity. Increasing research activities on assessing ecological consequences of artificial night lighting in recent years have attracted the attention of both scientists and journalists. This ‘ecological light pollution’ causes changes in reproductive physiology, circadian and circannual rhythms, migration, and foraging of organisms and ultimately leads to loss of biodiversity.

Seabirds are intimately linked with the light features of their environments because they are nocturnally active. Petrels and shearwaters are specifically known to be very sensitive to artificial lights because they regularly attend breeding colonies at night. Artificial lights can attract and disorientate birds, particularly fledglings during their first flight to the sea, and thus many of them fall to the ground with fatal injuries, are killed by predators, or die of starvation.

On São Miguel Island, in the Azores archipelago, a campaign called ‘SOS Cagarro’ was initiated, reporting light-induced falls of Cory’s Shearwater during a 2-year study (2008 and 2009). A total of 779 birds were found grounded, more than 80 % of which were still alive. These in-situ reference data can be compared with satellite-observed nighttime lights as derived from the Defense Meteorological Satellite Program (DMSP) Operational Linescan System (OLS). An annual composite of stable lights (2008) is used to analyze and highlight spatial correlations of altered environmental conditions detected with remote sensing and reported impacts on the ground. Furthermore, the exposure of the habitats of seabirds to nighttime lighting is analyzed. Bird fall records are spatially assigned to the respective closest colony, which provides an indication of actual risk and impact patterns for these populations.

To minimize stress from light pollution on Cory’s Shearwater and marine birds in general, we strongly recommend conservation management measures such as reduction and control of lighting intensity near colony locations, especially during the peaks in fledging, while continuing and re-enforcing rescue campaigns. Ultimately, legal formalization would be highly favorable for coastal areas because sustainable lighting control measures would significantly limit adverse effects of light pollution on these biodiversity hotspots.