

DESKTOP REVIEW OF CURRENT POLICY AND LEGISLATION ON LIGHT POLLUTION

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LIFE Arċipelagu Garnija (LIFE14 NAT/MT/991)

Securing the Maltese Islands for the Yelkouan Shearwater *Puffinus yelkouan*.

Action C.2: Address and reduce current light pollution affecting *P. yelkouan* colonies utilising policy and legislation





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yelkouan

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1. Introduction

Light pollution is a global problem of growing concern. Increasing urbanization and standard of living of the global human population has increased the amount of light pollution dramatically. Research in recent years has highlighted the various negative effects that light pollution has not only on the natural environment but also on human health and psychology (Falchi *et al.* 2011, Gaston *et al.* 2015). As a result, there is now a need for light pollution policies to move beyond energy efficiency and include those that benefit human health and the integrity of natural ecosystems (Hölker *et al.* 2010). Despite The consequences of light pollution on the natural world being observed and researched for a number of years, actions to address the problem of light pollution affecting ecologically sensitive sites have only recently been undertaken. It remains the case that artificial lighting is becoming brighter and shifting towards a whiter light as developers opt for energy efficient LEDs over the yellow high pressure sodium bulbs. This has the effect of extending artificial light further into natural areas (Hölker *et al.* 2010). A balance must be met between meeting the minimum human requirement for artificial lighting and the tolerable level of light in the nocturnal natural world.

Malta has experienced a period of rapid development in recent decades. Increasing national wealth and immigration has caused a rise the demand for housing significantly, coupled with the ongoing improvement of national infrastructure, the level of light pollution has increased dramatically across the Maltese Islands (Pace and Brincat, 2018). Once famed for its pristine night sky, light pollution in Malta has increased to such a level that the Milky Way is only observable from 11% of the country (Falchi *et al.* 2016).

Malta supports important populations of threatened seabird species including around 9% of the global population of Yelkouan shearwater *Puffinus yelkouan*, which is endemic to the Mediterranean. Shearwaters and related seabirds of the Procellariiformes group are especially vulnerable to light pollution (Rodriguez *et al.* 2012). The effects of light pollution on the natural world are not fully understood. However, it is clear that with respect to shearwaters and petrels there are two main negative and observable impacts (Laguna *et al.* 2014).

First, the majority of shearwater colonies in Malta are located in cliffs with minimal human disturbance. Light pollution from expanding human settlements and development has caused the extent of these breeding colonies to shrink (Sultana *et al.*, 2011). As shearwaters are most active around the islands during the hours of darkness, any increase in the artificial illumination of their breeding colonies is likely to cause changes to their behaviour, including; colony attendance and chick provisioning whilst also increasing risk of predation. These factors have the combined effect of reducing habitat suitability for nesting shearwaters and may result in the complete abandonment of breeding colonies, as has been noted here in Malta and for other seabird species abroad (Jones *et al.* 1990; Montevecchi 2006; Raine *et al.* 2007; Sultana *et al.* 2011). Secondly, light pollution is a leading contributor to the mortality of fledgling shearwaters (Rodriguez *et al.* 2012). They are disoriented by bright lights and become stranded on land. Whilst on land they are vulnerable to predation by mammals, may collide with vehicles or buildings, or may starve or succumb to dehydration (Montevecchi 2006; Raine *et al.* 2007; Rodriguez *et al.* 2012; Laguna *et al.* 2014). Between 1978 and 2017 there have been 205 cases of seabird stranding in Malta, with over 40% of all stranding cases in BirdLife Malta's database occurring from 2014 to 2017. This indicates a rapidly deteriorating situation regarding the relationship between Malta's light pollution and shearwater populations.

In order to secure the Maltese Islands for breeding Yelkouan shearwaters, it is vital that light pollution is tackled not only at their breeding sites, but also on a national level.

This review details the light pollution specific laws in Malta and the international community.

2. Review of legislation

2.1 Previous light pollution legislation in the Maltese Islands

Maltese legislation concerning environmental protection has fallen under the remit of several governing entities since its inception in 1972. During this time, it was the responsibility of each separate entity to enact environmental protection laws at their own discretion. In 1996, the Environmental Protection Department (EPD) was formed. As a single entity, the EPD was able to design a nationwide standard for environmental protection laws.

The Environmental and Development Planning Act (CAP 504) was the most recent provision for environmental protection laws. It makes no mention of light pollution specifically.

The Structure Plan for the Maltese Islands (MEPA 1990) contained no legal regulations for mitigating light pollution.

The BirdLife Malta EU LIFE Yelkouan shearwater project highlighted the lack of relevant legislation in their 2007 report (Raine *et al.* 2007). Despite guidelines being considered by the Maltese Environment and Planning Authority, no changes were made to legislation by the time of the 2016 demerger. Previously, MEPA's authority allowed for the refusal or alteration of planning applications with respect to excessive light pollution, although no such case is documented.

2.2 Current legal and policy framework for light pollution in the Maltese Islands

2.2.1 Competent Authorities

The 2016 demerger of MEPA saw the formation of two separate regulatory bodies; The Environment and Resources Authority (ERA), responsible for the Environment, and the Planning Authority (PA), responsible for planning and development. As developments – such as buildings or infrastructure - are a major source of light pollution within Malta, working with both authorities would be necessary to mitigate light pollution.

ERA is the Competent Authority responsible for the Environment Protection Act (CAP 549), which replaces the previous environmental protection legislation of the Environmental and Planning Application Act (CAP 504). ERA is also responsible for the transposition of EU environmental protection legislation, EU Environment Acquis. As part of the application process, developments are examined by ERA to identify whether the project qualifies for an Environmental Impact Assessment. Potential light pollution and its impact on for instance ecosystems and biodiversity of a development is considered and evaluated as an accumulative disturbance factor during an EIA Screening process. If significant impacts of the development are identified, an EIA procedure is required and suitable mitigation measures need to be outlined.

2.2.2 The Marine Policy Framework Regulations (SL 549.62)

The Marine Strategy Framework Directive (MSFD) (2008) is European legislation that aims to achieve Good Environmental Status (GES) of European waters by 2020. The MSFD was transposed to Maltese legislation as the Marine Policy Framework Regulations (SL 549.62). This established a framework to achieve or maintain GES in the marine environment by 2020. ERA developed an Integrated Marine Monitoring Programme under Regulation 9 and a Programme of Measures under Regulation 10. This Programme of Measures, directly addressed the issue of light pollution arising from developments and marine activities within terrestrial protected areas affecting selected species (particularly measures related to seabirds, marine reptiles and mammals). The Program of Measures was published in April 2017. It described the steps already taken and those still required to achieve GES. Several new measures proposed in this document detail changes needed in order to reduce or mitigate all sources of light pollution to benefit Malta's breeding seabirds (Marine Strategy Framework Directive; Malta's Programme of Measures, 2017). The relevant new measure proposed, MICMT-M009, aims to produce a guidance document to reduce and mitigate light pollution from developed areas and associated infrastructure (e.g. road lighting). It should be noted that these measures are only advisory. The details of the guidance are detailed below (Cost Effective and Cost-Benefit Analysis of new measures put forward as part of Malta's Marine Strategy Framework Directive Programme of Measures, 2017).

- a. Inform development permitting processes with a view to ensure consideration of light pollution in sensitive areas and the adoption of mitigation measures through such processes;
- b. Guide urban/infrastructural planners, architects and developers with respect to mitigation measures to be adopted for sites proximate to seabird breeding sites, including advice on alternative, low-impact lighting systems; and
- c. Create public and business awareness in key areas, as well as establish appropriate codes of conduct (e.g. encouraging the switching off of unnecessary lights, discouraging over-lighting in hotel porches etc.)

2.2.3 The Strategic Plan for the Environment and Development, 2015

The Structure Plan for Malta was replaced by the Strategic Plan for the Environment and Development (SPED) in 2015. The main objective of the SPED is, *"to safeguard and enhance biodiversity and cultural heritage"*. Thematic objective 8.9 of the SPED aims at, *"controlling sources of light pollution which negatively affect the rural area."* The SPED imposes no legal regulations concerning light pollution. As the SPED falls within the context of the LN 497 of 2010, a Strategic Environmental Assessment (SEA) was carried out in 2015 - prior to the adoption of the plans and programmes to be implemented as a part of the SPED. The SEA report includes light pollution from marine activities and development as a "spill-over" threat to biodiversity. The report recommends that further development in coastal areas be performed only in specific designated areas. Being rather broad in scope, the SEA report makes clear that MEPA had taken steps to address light pollution as a threat to biodiversity. However, it fails to provide legal regulations on existing light pollution nor does it restrict the type of lighting that may be used in new development.

2.2.4 The Environment Protection Act, 2015 Part VI, Article 58

The Environment Protection Act of 2015 formally acknowledges the negative impacts of artificial light on species and ecologically sensitive areas. Activities and operation which generate light pollution require authorisation by ERA.

2.2.5 The National Environment Policy and the National Strategy for the Environment

The National Environment Policy (NEP) provides measures aimed at protecting the rural environment from inappropriate development, including that giving rise to light pollution. Additional policies protecting representative species and ecosystems are also provided. Furthermore, the NEP provides policy for integral wildlife corridors, buffer zones and stepping stones interlinking landscape matrices, habitats or protected areas, adding that, “such areas will also be protected from infrastructure development giving rise to light pollution”.

ERA is currently preparing the National Strategy for the Environment (NSFE). The NSFE is a strategic governance document to be adopted by the House of Representatives. In conjunction with the Environment Protection Act (Cap. 549), the NSFE will set policy framework for the preparation of plans, policies and programs issued under Environment Protection Act (Cap. 549) or any other Act for the protection and sustainable management of the environment, including land and sea resources. According to ERA, the NSFE will address the following:

- environmental policies;
- the State of the Environment Reports as produced by ERA in line with the Environment Protection Act (Cap. 549);
- the current economic and financial policies;
- the current social policies;
- the policies of the Government;
- the environmental issues and concerns of material relevance to the strategy, which would also include light pollution and related matters;
- the resources likely to be available in all relevant government entities for the implementation of the Strategy; and
- the European Union Environment *Acquis* and other international environmental agreements to which Malta is a party.

2.2.6 The National Biodiversity Strategy and Action Plan 2012-2020

Malta's National Biodiversity Strategy and Action Plan 2012-2020 (NBSAP), as adopted under the Environment Protection Act (Cap. 549), provides targets and measures to halt biodiversity loss by 2020 and promote recovery of damaged ecosystems. Target 8 of NBSAP has the objective of implementing effective measures to address pollution. Light pollution would fall under the broad scope of this target.

2.2.7 The Flora, Fauna and Natural Habitats Protection Regulations, 2006 (SL 549.44)

The Flora, Fauna and Natural Habitats Protection Regulations, 2006 (FFNHPR, SL 549.44), requires any application affecting protected areas and protected species to be pre-screened by ERA. Four general mechanisms govern this regulation, applicable to both development and non-development aspects:

- **Management Plans, Management Agreements and Conservation Orders:** The FFNHPR, on the basis of Regulations 15-17, has seen the establishment of various management plans, management agreements and conservation orders. Regulations 15-17 include provisions involving impacts on protected habitats, protected species and other biodiversity of importance. Issues linked with disturbance, such as light pollution, are included.
- **Activity Permitting:** Operations and activities which are envisaged to have an impact on biodiversity, including lighting, particularly rural areas where most protected areas under the

National Ecological Network are located are subject to Regulation 18 of the Legal Notice through a notification-authorisation system. This requires prospective applicants to notify ERA, who in turn shall notify the applicant of its consent or otherwise for the carrying out of such operation or activity.

- **Appropriate Assessments:** Regulation 19(1) of the FFNHPR, SL 549.44 states that; ERA, or the applicant, shall make an appropriate assessment of the implications of any operation or activity which is not directly connected with or necessary to the management of a protected site and is likely to have a significant effect on such a site. Consent will only be given by ERA after ascertaining that the plan or project will not adversely affect the integrity of the site concerned. The opinions of the general public and other representations are also taken into consideration.
- **Species Protection, Nature Permitting and Derogations:** Parts IV and XI of the FFNHPR protect various threatened and/or endemic species nationwide. They impose prohibitions impacting their biological life cycle, including disturbance. Such disturbance covers important lifecycle aspects such as; breeding, rearing, hibernation and migration. Artificial lighting, particularly in rural areas, have to take in consideration this aspect. A permitting and derogation system has been established to control and mitigate such disturbances. Regulations 43-46 detail the nature permitting system, these also include provisions on derogations to international law such as the EU Habitats Directive, various multilateral environmental agreements under the Council of Europe (COE) and United Nations (UN), implemented through these Regulations.

2.2.8 Environmental Assessment

During the environmental screening process of applications, light pollution is taken into consideration as an environmental issue by ERA, as relevant depending on the location of the proposal and the case-relevance of the light pollution impact. Development proposals and other plans and projects falling under subsidiary legislation of the Environment Protection Act (Cap. 549) may even require other types of environmental assessments, including an Environmental Impact Assessment (EIA) screening procedure of projects in terms of the EIA regulations, 2007 (SL 549.46) and/or an Appropriate Assessment procedure under Regulation 20 of Flora, Fauna and Natural Habitats Protection Regulations (S.L.549.44) in view of their impacts on Special Areas of Conservations (SAC) and Special Protection Areas (SPA).

2.2.9 Development Control Design Policy, Guidance and Standards 2015 (DC, 2015)

Good Practice Guidance G27 aims at preventing light pollution by requesting that:

Any proposed development or redevelopment should not be a source of light pollution. To this effect:

- a) lighting should be strictly limited to within the developed part of the site and should direct light only where the light is required and only when the light is needed;*
- b) the development should not be considered as a justification for the lighting of the access roads, tracks and paths leading to the site or other lighting beyond the site boundary;*
- c) the lighting should be from any peripheral landscaping inward, so as to be screened as much as possible by the landscaping itself; and*
- d) with the exception of architectural lighting on historic structures, all exterior lighting installed on site should be of the downward-pointing, full cut-off type which when installed at the specified design*

attitude gives zero intensity at and above the horizontal. No luminaire globes or up-lighters would be accepted.

Any development planning application, particularly related to historical structures, which includes architectural lighting, is to be accompanied by a lighting scheme report endorsed by an independent Warranted Engineer certifying that the proposed lighting will minimise light pollution.

Any lighting installation, including the external lighting of buildings, structures and roads, may require an ERA permit and/or written endorsement when proposed within protected areas designated under environment legislation, or within 30 metres of the boundaries of such areas, or where the lighting affect protected areas or species.

2.2.10 The Development Notification Order (Legal Notice 211/16)

The Development Notification Order (DNO) recognises that artificial lighting is classified as development, albeit permitted, provided it is not within a UCA, ODZ or within 30 metres of a scheduled property. In such cases, a notification in line with the DNO procedures would be required. It also goes on and states where such lighting is not permitted. The full text of the relative class in the DNO is being reproduced below.

CLASS 12

Lighting of buildings, structures and roads

- (i) the external lighting of buildings, structures and roads provided that the development is not permitted where:*
 - (a) it is incompatible with the character of the location and/or create unacceptable light pollution; or*
 - (b) in the case of street lighting ODZ, involves lighting beyond the street itself and/or cause unacceptable light pollution in an area that should be kept free from artificial nocturnal lighting or compromise the conservation of important flora, fauna or ecosystems;*
 - (c) it involves the illumination of any sign or advertisement, or such illumination constitutes its primary purpose; or*
 - (d) it involves an area larger than a building or structure;*
 - (e) it involves a scheduled property.*

For the purposes of this Class, temporary lighting of buildings and structures, for festivities and similar events, shall not be deemed to constitute development.

Development under this Class, where the site or lighting equipment of buildings and structures lies in a UCA or ODZ or in a designated area or in or within 30 metres of a scheduled property, shall be subject to the notification procedure established in regulations 5(1) and 5(3).

2.2.11 Site Specific Policies

Various site-related policies under both the Development Planning Act (Cap. 552) and Environment Protection Act (Cap. 549) include specific provisions addressing directly or indirectly light pollution or related aspects affecting biodiversity or human health. The Natura 2000 Management Plans and Conservation Orders include various provisions relevant to impacts on biodiversity.

The Gozo and Comino Local Plan has introduced two site specific policies to control nocturnal illumination and combat light pollution.

Policy GZ-UTIL-5: *MEPA will request that proposals including outdoor illumination will have luminaries which are energy efficient and have an Upward Light Ratio of 0%. MEPA will also request that low-wattage, low level lighting is employed in public gardens and that in environmentally sensitive areas (e.g. scheduled areas or sites, valleys, ridge edges), external artificial illumination levels should be kept to the barest minimum (refer to policy GZ-DARK-1).*

Policy GZ-DARK-1: *The areas shown in MAP 13.8 (Figure 1) shall be designated as Dark Sky Heritage Areas. Where relevant, reflective signs shall be employed to guide driving at night, whilst the installation of lighting which is not related to aerial or maritime navigation, shall be strongly discouraged.*

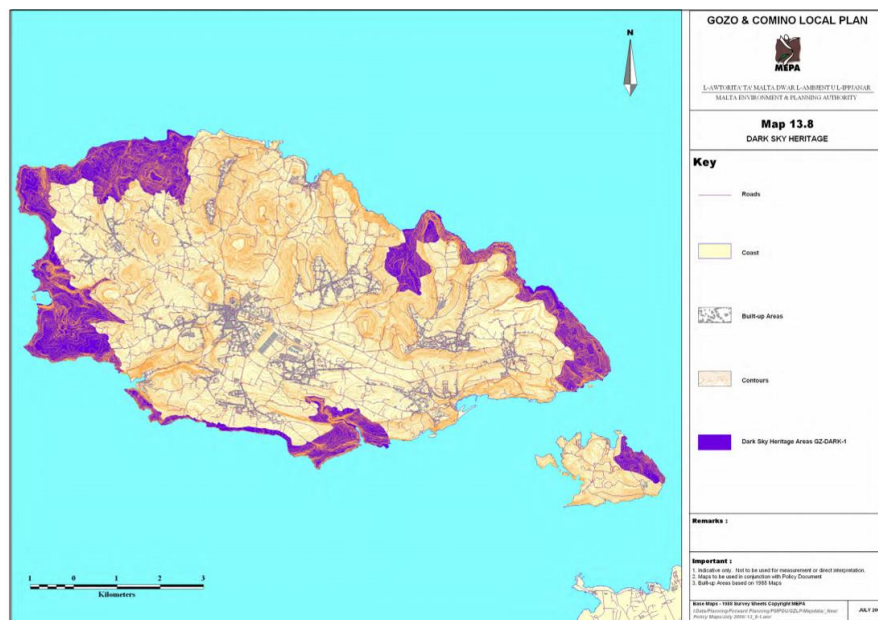


Figure 1: Dark Sky Heritage Map of the Gozo and Comino Local Plan.

2.2.12 Other Applicable Legislation

Various other legislation and policies, particularly under the Environment Protection Act (Cap. 549), address light pollution issues indirectly.

The Fungus Rock (il-Ġebbla tal-Ġeneral) Nature Reserve Regulations (SL 549.01) and Selmunett (St Paul's Islands) Nature Reserve Regulations (SL 549.03) prohibit access to the islands or parts thereof, and protected the flora and fauna of the islands, consequently addressing issues linked with installation of artificial light in prohibited areas). A permitting system, administered by ERA, is in place.

Similarly, permitting systems are set up under ERA through the Reptiles (Protection) Regulations (SL 549.02), the Marine Mammal Protection Regulations (SL 549.35) and the Trees and Woodlands Protection Regulations (SL 549.64).

Additional provisions related to wild birds and disturbance are also provided by the Conservation of Wild Birds Regulations, 2006 (SL 549.42).

2.3 International legislation

International efforts to reduce light pollution vary greatly between countries and even between the different administrative regions of a single country. As a result, national legislation regarding light pollution has often been implemented on a regional basis concerning specific sites of interest, i.e. astronomical observatories and national parks (Narisada & Schreuder, 2013). In light of our increasing scientific understanding of the negative impacts of light pollution, many countries are beginning to introduce national regulations to reduce light pollution.

All countries in the EU must follow the EU directives concerning environmental protection. The EU has instigated programs (GreenLight, E-Street) that aim to adopt efficient lighting systems (Narisada & Schreuder, 2013) Night Light is a recent Interreg Europe project co-funded by the European Regional Development Fund (ERDF). The project involves a number of partners aiming to reduce light pollution through introducing policy measures in each participating state. As the project is still in its early stages, no results have been published as yet.

Italy

Regional policies against light pollution were enacted by various Italian administrative regions between 2000-2007. The laws were designed in unison with the direction of various organizations working to reduce light pollution in Italy. However, as different administrative regions enforce their own laws regarding light pollution, the effectiveness of these regional policies differs greatly between the different administrative regions.

Slovenia

In 2007, Slovenia passed the Slovene Light Pollution Law (Vertačnik, 2011). This law details a vast number of changes governing existing lighting schemes to new developments. Important articles include: details of permissible light fixtures; luminaries shining 0% above the horizon, i.e. no light above the horizon; upper limits for illumination of different building types. Concessions were made to buildings of cultural importance; airports and harbours and security lighting. As a result, levels of light pollution in Slovenia have fallen dramatically whilst energy efficiency has increased in all major cities studied (Vertačnik, 2011).

Croatia

Croatia's Law on Protection from Light Pollution provides a framework for new developments and existing structures. Special provisions are made with respect to protected areas, inhabited areas and other areas considered sensitive to light.

France

In legislation primarily targeting sources of non-domestic lighting, light pollution laws in France avoid quantifying light, rather they impose curfews on light usage (Morgan-Taylor 2014). Interior lighting in places of work is turned off an hour after the last employee leaves and outside lighting must be turned off between 1AM and 7AM. Although these regulations have effectively reduced light pollution, particularly in urban areas, the legislation does not attempt to regulate consumer lighting which is often a common cause of problems outside of urban areas. Furthermore, no regulation on installation is provided for within the legislation.

North America

The Model Lighting Ordinance (MLO) was approved by the International Dark-Sky Association (IDA) and the Illuminating Engineering Society of North America in 2011. The MLO exists as a template for outdoor lighting standards that reduce glare, light trespass and sky-glow. The MLO encourages the adoption of comprehensive outdoor lighting legislation by municipalities through reducing the time demands of local governments when developing their own legislation. The IDA have also designed the Model State Lighting Legislation (MSLL). Similar to the MLO, the MSLL is a template for outdoor lighting legislation at a State level – this model was used in the design of the light pollution law enacted by the State of New York in 2014.

3. Discussion

The existing Maltese national legislation provides a robust and extensive framework regarding light pollution. The laws and policies included in this review are designed to control and mitigate light pollution for protected areas, protected species, and other areas of high biodiversity importance. Malta currently has a particularly well-developed legislative framework when compared to other European countries (Narisada & Schreuder 2014). With such a framework already in place, the level of light pollution across the Maltese Islands is wholly unacceptable. Recent studies conducted in Malta have identified many areas experiencing severe light pollution from local light sources and significant light pollution has been recorded at areas that are far from light sources (Pace & Brincat 2018, Vella 2018). Enforcement of the relevant laws and policies must be a priority for ERA and will have an immediate and significant effect on the level of light pollution in Malta.

What the legislation does not provide for are expansive details and guidance on permissible light fixtures or appropriate levels of illumination, nor does it address the problem of pre-existing sources of light pollution. Without restricting the types of light fixtures available to developers, new building projects are likely to continue toward the global trend of developments becoming oversaturated with white light LEDs. The conversion to LEDs in Malta is strongly recommended with respect to energy efficiency. However, the transition must go beyond improving energy efficiency, focusing on the implementation of properly installed luminaires with an Upwards Light Ratio of 0% (ULOR of 0%) and with a Colour Corrected Temperature (CCT) less than 3000k. Currently no time restrictions have been imposed on lighting, bright lights are left on unnecessarily throughout the night.

Local Policies GZ-UTIL-5 and GZ Dark 1 of the Gozo and Comino Local Plan are excellent examples of local councils recognising the value of unblemished natural landscapes through imposing lighting regulations on new developments. The effectiveness of Local Policy GZ-UTIL-5 in particular would be increased if it was extended to existing outdoor lighting schemes that are contradictory to the policy. A level of regional control, additional to those policies already enacted at a national level, would better enable local councils across Malta to counter light pollution; however, care must be taken that the policies enacted by different regional councils in Malta complement each other. A national model lighting policy would aid local councils in their designing of local policy concerning light pollution. With minimum effort of light pollution source reduction the dark sky areas could be expanded further.

Malta is in unique position to improve the condition of its night skies when compared to continental European nations. Being a small archipelago with its closest neighbor, Sicily, 80km to the north, Malta is largely unaffected by light pollution outside of its jurisdiction. Therefore, any changes made will have their

desired effect. Furthermore, just as the small size of the islands exacerbate the effects of light pollution, where a few inappropriately installed lights have a big impact, it will also help when addressing the problems of the current outdoor lighting scheme of the Maltese Islands.

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