



Dark Sky Reserves status for Snowdonia



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1.0 Executive Summary

This document sets out Snowdonia National Park Authority's application to the International Dark-Sky Association (IDA) to designate Snowdonia National Park (SNP) as an International Dark Sky Reserve (IDSR). Snowdonia National Park Authority (SNPA) is committed to the protection and conservation of all aspects of the environment, including the night sky, and as such supports the mission and goals of the IDA.

The Authority believes that achieving IDSR status for the SNP will further raise the profile of the Light Pollution issue in Wales following the successful application from the Brecon Beacons National Park Authority in 2013. It will assist SNPA in gaining support in protecting the excellent quality of dark skies which we already have in Snowdonia from the general public, business, and politicians, and to improve it further where needed.



Snowdonia National Park is one of three National Parks in Wales, and one of 15 in the UK. It is located in north-west Wales, about an hour and a halves drive from large urban populations such as Wrexham, Liverpool, Manchester and Birmingham. It contains some of the best areas of dark skies in England and Wales, which SNPA wish to protect for the benefit of the residents and visitors of the National Park, and for future generations. Whilst still predominately a rural area, data suggest that light pollution has increased in areas of the National Park, thus posing a threat to the quality of the night sky. We believe that gaining IDSR status will go a long way in addressing any further degradation of dark skies quality in the future.





Whilst the Snowdonia Dark Skies initiative, entitled *Seeing Stars*, has been led by the SNPA, we have worked closely alongside a host of stakeholders throughout the consultation period, most importantly the residents of Snowdonia National Park. Together, we hope to;

- combat further encroachment of light pollution into the Snowdonia National Park and the surrounding area;
- mitigate the adverse effects of this pollution;
- raise awareness and understanding of this special quality of the National Park and work alongside relevant groups in maximising benefits to local communities and business owners in the area.

We believe that these broad objectives are to be achieved through engagement with local communities, government bodies, the commercial sector and other concerned organisations to form partnerships which will drive the project forward over the coming years.

Whilst we acknowledge that the IDSR status is an astronomy based designation, SNPA wish to emphasise the multiple benefits which can be derived from reducing levels of light intrusion. These include benefits to nocturnal wildlife, reduction in energy usage and creation of opportunities in the astro-tourism sector, all of which feature prominently in the Snowdonia National Park Management Plan 2010 - 2015.

We have received widespread support for our initiative, and through a combination of media coverage, open evenings, conferences and school visits, we have engaged with a large number and diverse range of groups, all of which are essential if we are to achieve the ultimate aims of our endeavour. This support is reflected in Section 6 and Appendix 1 of this application document, which contains a considerable number of letters highlighting the thoughts of those who wish to see us succeed with our application.

Our survey of the Night Sky Quality gave evidence of the high quality of the night sky in Snowdonia (sometimes referred to as Eryri within this document), which has given us encouragement to pursue this prestigious status for Snowdonia. However, where improvements are needed, we are confident that these can be achieved by working alongside the relevant stakeholders to ensure our high levels of dark skies are retained for years to come.

The approach that the Snowdonia National Park Authority has taken is to use the criteria for IDSR status as guidelines for good practice on light pollution, but we also hope that in so doing we will gain recognition from the IDA.



The Milky Way and meteors during the Perseid Meteor Shower, taken from within Core Zone 2, August 2015

2.0 Introduction to National Parks

Snowdonia National Park is one of 15 National Parks in the UK, three of those being in Wales. It was designated in 1951 under the provisions of the National Parks and Access to the Countryside Act, which was formally adopted in the UK in 1949. Each national park is bound by two statutory duties, which are implemented and governed by the relevant National Parks Authority. These duties are:

- to conserve and enhance the natural beauty, wildlife and cultural heritage of the Park, and
- to promote opportunities for the enjoyment and understanding of its special qualities.

In pursuing these duties, the National Park Authority also has a legislative duty to foster the economic and social well-being of local communities.

In addition, NPAs are responsible for implementing national planning legislation and granting planning permission for developments within the National Park. Planning policy and guidance is set at a national level (UK Government for Nationally Significant Infrastructure Energy Projects with all other planning matters being devolved to the Welsh Government). The NPA interprets national guidance and develops a local land-use planning policy framework which is set out in a Local Development Plan (LDP). The policies within the Eryri Local Development Plan (adopted in 2011) are supported by a suite of Supplementary Planning Guidance documents which encourage best practice and assists developers and others wishing to submit planning applications for developments in the National Park.



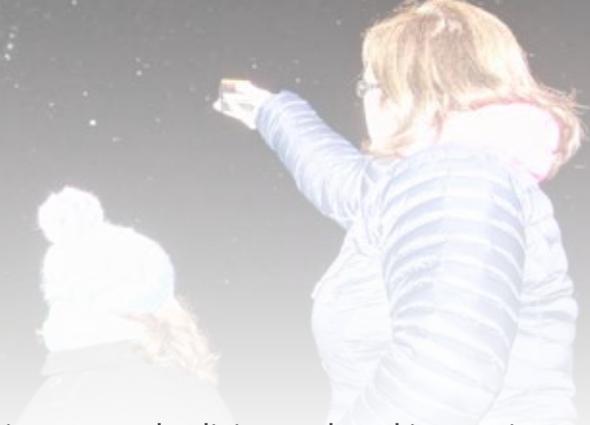
The Authority also has a responsibility for producing an overarching strategy for the whole area called the National Park Management Plan. This document lays out the whole area's 20-year strategy and 5-year actions by and for everyone delivering its purposes and duty, or concerned about the Park's future.

Each NPA is governed by a board of members – board members are appointed from the Local Government Councils that cover the National Park Area and also include specially appointed members direct from National Government.

The board members act as advocates of the National Park Authority making decisions and oversee performance through participation in Authority meetings, committees, advisory groups and working groups, applying the principles of National Parks and sustainable development to all decision making.

Figure 1 – National Parks of the UK





Unlike some National Parks abroad, Snowdonia is very much a living and working environment. Approximately 26,000 people call the National Park their home, largely centred on the towns of Bala and Dolgellau to the south, Harlech and Trawsfynydd in the centre, and the villages of Beddgelert and Betws y Coed in the north. In addition, many larger, more populated towns and villages lie within a few short miles of the National Park boundary such as Bangor, Caernarfon, Llandudno, Porthmadog, Machynlleth and Blaenau Ffestiniog to name but a few. Indeed, the latter actually forms an island within Snowdonia National Park, having been omitted during its formation due to high levels of industrial presence as a result of the slate mining industry. Whilst the vast majority of large towns and villages are located outside of the core and critical buffer zones, they nevertheless pose a threat to sky qualities within these areas.

The Snowdonia National Park Authority

The Snowdonia National Park Authority Board meets five times a year, and has 18 members; 9 Local Councillors appointed by Gwynedd Council, 3 Local Councillors appointed by Conwy County Borough Council, and 6 members appointed by the Welsh Assembly Government. Two local Authorities have responsibilities for parts of the National Park, which are Gwynedd Council and Conwy County Borough Council.

All planning applications, future developments and land use planning within Snowdonia National Park are guided by the Eryri Local Development Plan (2007 – 2022), which was formally adopted by SNPA in July 2011. The LDP is one of 2 statutory plans that the Authority must produce – the other being the National Park Management Plan. The LDP aims to reflect the land use implications of the National Park Management Plan as well as providing an opportunity to deliver the spatial elements of other plans and strategies at the national, regional and local level. The LDP includes strategic policies and development policies which will deliver the long term spatial vision for the future of Snowdonia National Park. A wide range of stakeholders were involved in its preparation, and their continuing involvement in the process of implementation and monitoring is important. This document will clearly play an important role in controlling any future development which may impact upon the quality of the night sky.



Settlements within the Park

Snowdonia National Park is home to approximately 26,000 people, with many more living within a very short distance of its boundaries. The majority of these live within the main towns and villages of Snowdonia, namely Betws y Coed, Beddgelert, Trawsfynydd, Harlech, Dolgellau and Bala. According to the 2011 census, the five parishes within the National Park with the largest populations were as follows:

- Dolgellau – 2,688
- Bala – 1,974
- Dyffryn Ardurdwy – 1,540
- Harlech – 1,447
- Trawsfynydd - 973

In addition to the towns and villages which lie within SNP boundaries, there are also several larger town, all of which are within 5 miles or so of the National Park. These include Blaenau Ffestiniog (which forms an 'island' within SNP), Porthmadog, Llanberis, Caernarfon, Bethesda, Bangor, Conwy, Llandudno, Colwyn Bay, Llanrwst, Machynlleth, Tywyn and Barmouth to name some of the main ones.

Land Ownership

SNPA own very little land within the National Park, with approximately 1% being in SNPA ownership. Of the 2,000 km² of land within the Snowdonia National Park, over three-quarters of this land is used for agriculture. Of this, over 1,400 km² is under private ownership with the vast majority of the land owned or managed by the National Trust and Natural Resources Wales. A full breakdown of land ownership within Snowdonia National Park is as follows:

Ownership Type	Land Share %
Private	69.9
Natural Resources Wales	17.5
National Trust	8.9
National Park Authority	1.2
Water Companies	0.9
Other	1.6





Wildlife

Snowdonia is synonymous with extensive areas of windswept uplands and jagged peaks. Apart from the beauty and charm of its high mountains, Snowdonia has inspiring semi-natural habitats, which are a product of both natural forces and human activities. Due to its location on the western edge of Europe, Snowdonia is swept by warm, wet weather, making it an ideal home for thousands of species and their habitats. Many of these species and habitats are of international importance, some of which cannot be found anywhere else in the world! Perhaps the fact that approximately a third of the National Park is designated due its ecological interest is testament to the diversity and importance of the area for wildlife.

Many of the species which call Snowdonia home are nocturnal. For example, 14 of 17 bat species which are native to the UK are thought to reside in the National Park, with Snowdonia being a particular hot spot of the lesser horseshoe bat *Rhinolophus hipposideros*. In addition, you'll find an abundance of moths, nocturnal birds (owls and so on) and a host of mammals which all thrive in the night time environment. Consequently, reducing light pollution due the adverse impacts it can pose the nocturnal wildlife is one of the main drivers for SNPA's attempt to gain IDSR status

History

Human history, as well as the history of the landscape, is important here in Snowdonia, and by today, Snowdonia has evolved from a rich tapestry of history, culture and landscape that dates back to prehistoric, pagan times followed by the Roman occupation, the rise of Christianity, the age of the Mediaeval Princes, the Viking, Anglo Saxon and Norman invasions through to the industrial revolution and modern times.

Evidence of these historical eras can still be seen in the dramatic landscapes of the mountains, valleys and coastline of the region from the network of Celtic hill forts, religious shrines, standing stones, magnificent ring of mediaeval castles, churches and fascinating industrial remains, whereas other elements of our history, such as witchcraft, have survived through the tradition of passing oral information from one generation to the next.



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Some interesting historic facts about Snowdonia include:

- Snowdonia has a wealth of castles, mostly built by warring princes during the 13th Century. These include Castell y Bere (near Abergynolwyn), Castell Dolwyddelan and Castell Dolbadarn (Llanberis). They were taken into Norman hands when Edward I began his determined conquest of Wales during the closing years of the century.

Harlech Castle, built in the 13th Century, is perhaps the most spectacularly situated of all King Edward's castles. His mighty fortresses at Harlech, Conwy, Caernarfon and Beaumaris (Anglesey) were all built to subdue the newly conquered lands of North Wales.

- Snowdonia has a rich history of medieval princes dating from circa 600AD, when Gwynedd was the most powerful of the kingdom in Wales, mainly due to the fact that Snowdonia's mountainous terrain was an aid to defend the area. The history of Welsh princes continues to the end of the C13, when Llywelyn ap Gruffudd (Llywelyn ein Llyw Olaf) was defeated in battle by Edward Ist army. Even to this day, Llywelyn ap Gruffudd is known as the 'last true Prince of Wales'.
- Snowdonia was once the global heart of slate production, with slate having been quarried in Wales since the Roman period, although the first written record of this dates back to the C14. Slates were produced on a major scale in Wales for the first time in 1782, in the Penrhyn Quarry, Bethesda and by the C19, Wales was the largest supplier of slates in the world and most of these slates were sourced from north west Wales.
- In 1831, Charles Darwin came to Snowdonia where he visited Capel Curig and Cwm Idwal. During this journey, Darwin developed skills in various geological fields, such as chemical observation and these skills were invaluable to him as he developed his theory on natural selection/ Michael Roberts refers to this journey in 1831 as "one of the most formative aspects of Darwin's scientific development.
- Yr Ysgwrn, home of Ellis Humphrey Evans (better known for his bardic name Hedd Wyn), can be found at the village of Trawsfynydd in the heart of Snowdonia National Park. Hedd Wyn was killed at the Battle of Pilkem Ridge on 31st July, 1917 and was posthumously awarded the 1917 National Eisteddfod Chair at Birkenhead, the highest accolade awarded to Welsh language poets. To the great sorrow of the audience at the chairing ceremony, it was announced that Hedd Wyn had indeed been killed in battle and in the absence of the rightful owner of the chair, it was draped in a black cloth and has been known ever since as 'the black chair', representing a generation of Welsh youth lost at the First World War.

4.0 The Problem of Light Pollution



If asked to give examples of pollution, we would most likely describe the pollution of water as a result of an oil spill, or of air pollution due to contamination of the atmosphere with unwanted gases. However, far fewer people would cite light pollution, which can be defined as *the disruptive brightening of the sky as a result of excessive, misdirected or intrusive artificial lighting*. This is despite the fact that it's on the increase globally.

Fortunately, Wales and particularly Snowdonia, still has areas large of excellent dark skies quality which are relatively free from light pollution. However, as Figure 3 clearly indicates, light pollution increased significantly in Wales between 1993 and 2000. Images such as these reinforce our belief that what we are trying to achieve here in Snowdonia is vital and worthwhile in ensuring that we continue to gain from the multiple benefits associated with good sky quality.

For example, various human health effects have been ascribed to excessive artificial lighting, including sleep deprivation which in turn can cause stress, and also an increased risk of cancer as a result of decreased melatonin production. Excessive lighting can also be both unsustainable and expensive to run, and in a time of economical and climatic uncertainty, such effects are unwelcomed. Unnecessary or unsuitable lighting can have major adverse impacts on the natural world, particularly if used in ecological sensitive areas such as along tree lines, river corridors or near areas where nocturnal wildlife may reside e.g. bat roosts or owl nests. This is without mentioning the significant adverse impacts light spill can have on our ability to see the stars of course, which is the primary focus of the IDA! SNPA believe that gaining IDSR status will go a long way in ensuring that our dark skies can be preserved for the benefit of all.

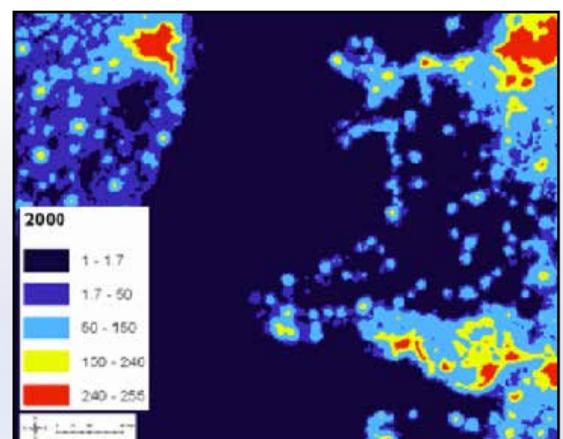
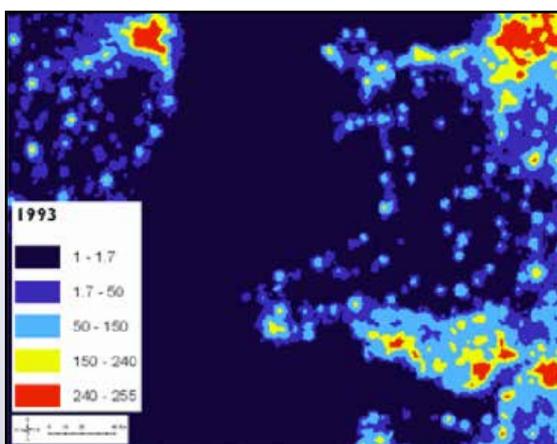


Figure 3 – Satellites images show increase in light pollution in Wales between 1993 and 2000 (NASA).



5.0 Countering Light Pollution

Fortunately, light pollution is reversible. Through gaining IDSR status, the Snowdonia National Park Authority will work alongside relevant stakeholders to ensure that the quality of our Dark Skies are maintained or improved for future generations.

The Snowdonia National Park

Whilst the Snowdonia National Park Authority have long considered the issue light pollution to be an important matter, it was in 2013 that the Authority decided to make initial steps towards gaining IDSR status having taken inspiration from our counterparts in Brecon Beacons National Park. Early discussions within the Authority and with external partners were very encouraging, and this, in conjunction with very good readings from initial Night Sky Quality surveys, convinced the SNPA to pursue the status further.

As previously stated, the objectives of the project are:

- To combat further encroachment of light pollution into the Snowdonia National Park and the surrounding area;
- Mitigate the adverse effects of this pollution;
- Raise awareness and understanding of this special quality of the National Park and work alongside relevant groups in maximising benefits to local communities and business owners in the area.

In so doing it also aims to gain International Dark Sky Reserve (IDSR) status for the Snowdonia National Park from the International Dark-Sky Association (IDA).





The Campaign for Dark Skies

The Campaign for Dark Skies (CfDS) was set up by concerned members of the British Astronomical Association in 1989, to counter the ever-growing tide of skyglow which has tainted the night sky over Britain since the 1950s. Usually the result of poorly aimed streetlights and floodlights emitting light above the horizontal into the sky, skyglow is nowadays increasingly a result of vastly over-powered, poorly mounted household security lights and literally “over-the-top” sports lighting.

CfDS has grown into a network of over 140 volunteer local officers, and several hundred committed supporters, who work to persuade their local councils and organisations of the benefits of well directed lighting, the motto being: the right amount of light, and only where needed.

The SNPA's Existing Light Pollution Policies

The Park's objectives and policies are stated in various Park Authority documents which define how the Park will be managed. The main documents which are relevant in this instance are the Snowdonia National Park Management Plan 2010 – 2015 and the Eryri Local Development Plan 2007 – 2022. Both documents are available electronically via the Snowdonia National Park website.



Snowdonia National Park Management Plan 2010 – 2015

The Snowdonia National Park Management Plan is a significant document in relation to the future of Snowdonia National Park. The National Park Authority is required by law to prepare a Plan to provide effective management involving all those concerned with the future of Snowdonia. It provides the strategic policy framework for relevant organisations to comply fully with their statutory responsibility to have regard for National Park purposes in carrying out their duties and responsibilities.

Although the National Park Authority prepares the Plan, it is a document for all who have a stake in its future, be they public, private or third sector organisations or individuals interested in the future of Snowdonia. In essence, ensuring a sustainable future for Snowdonia is our shared responsibility.

Whilst the Snowdonia National Park Management Plan makes no specific reference to the issue of light pollution, our Seeing Stars campaign contributes significantly towards many of the objectives of the management plan. These include:

Objective 1: Manage the effects of climate change through mitigation and adaptation, including reductions in climate changing gas emissions, **reductions in energy consumption** and improved flood risk management.

Objective 2: Promote good quality, **sustainable design** in new and existing buildings.

Objective 4: **Protect and enhance habitats and species** as notified in the Local Biodiversity Action Plan and Natura 2000 sites.

Objective 5: **Promote ecological connectivity** between sites within Snowdonia and its environs.

Objective 8: Promote and enhance distinctive landscapes and character types including **areas of tranquillity**.

Objective 11: Understand, value, protect and enhance: Scheduled Ancient Monuments, Listed Buildings, Conservation Areas and listed historic landscapes.

Objective 16: Prepare a Recreation Strategy for Snowdonia to ensure equitable, widespread and sustainable access which recognises the need to **protect tranquillity** and discourage damaging activities...

Objective 17: Promote **understanding and enjoyment** of the National Park's special qualities.

Objective 21: Promote economic growth in the environmental goods and services sectors.

Objective 22: Assist in delivering regional objectives relating to **sustainable tourism**.

In addition, section 3.1 of the Management Plan specifically states that the *'special qualities (of Snowdonia National Park) are essentially the defining characteristics of a National Park; they are distinctive and pronounced and set the area apart. Although some qualities may be present in areas outside the Park boundary, it is within the boundaries that they are most prevalent and marked. Providing a definitive list is difficult as many aspects, such as Snowdonia's inspirational features tend to be intangible and perceived and appreciated differently by individuals. However, through consultation and discussion with organisations and communities, a range of special qualities have been identified as important and distinctive to the area. They are... the opportunity for people to understand and enjoy the National Park actively, whilst maintaining areas of tranquillity and solitude, thus promoting aspects of health, well-being and personal reflection... Extensive opportunities for recreation, leisure and learning for people of all ages and ability combined with area of tranquillity.*

A review of The Snowdonia National Park Management Plan is currently underway, and if this application is successful, the revised management plan will reflect the key objectives associated with IDSR status.



Eryri Local Development Plan 2007 - 2022

The current policies are contained within the Eryri Local Development Plan (LDP) 2007 - 2022.

Development Policy 1: General Development Principles

To conserve and enhance the Special Qualities and purposes of the National Park development will only be permitted where all the following apply:

*xii. The development is compatible with, and does not cause significant harm, to the environment, neighbouring residential amenity or the amenity of the Park by way of noise, dust, vibration, odour, **light pollution, hazardous materials or waste production.***

Development Policy 10: Advertisements and Signs (10)

Advertisements or private signs on premises will only be permitted if all the following criteria are satisfied:

*ii. The sign is **not internally illuminated.***

Externally illuminated signs may be permitted where the following criteria are satisfied:

vi. The sign needs to be illuminated to enable customers to locate a business which is open during the hours of darkness.

*vii. The effects of the illumination do not compromise road safety and **do not harm the character of the site, its surroundings, or the amenity of neighbourhood.***

*viii. The effects of the illumination do not have any adverse effect on **tranquillity.***

Development Policy 21: Tourism and Recreation (21)

Within the National Park the provision of existing tourist facilities will be protected and enhanced through adopting the principles of sustainable tourism. New tourism development and the enhancement of current facilities will be supported where:

*vi. It does not have an adverse impact on the views to and from the National Park and does not generate an increase in noise or **light pollution.***

Please note that the LDP is to be reviewed in 2016, and will include policy changes relevant to our Dark Skies campaign should we be successful in our bid to designate SNP an IDSR.



Snowdonia National Park Authority Supplementary Planning Guidance

Whilst the Park Authority doesn't currently have a Supplementary Planning Guidance (SPG) specific to external lighting, several of the existing SPGs have sections that are relevant to the subject (please note that if successful with the application, SNPA intend on producing a new Supplementary Planning Guidance on external lighting specifically on lighting).

1. Guidance for sustainable design in the National Parks of Wales (page 18):

- *Consider the impact of external lighting on the surrounding area, surrounding area, and seek out designs that minimise 'backscatter' and general **light pollution**.*
- *Where exterior or street lighting is required consider how **light pollution** disturbance can be minimised, for example by use of full cut off fixture and a low pressure sodium light source.*

6. Nature Conservation and Biodiversity (Page 17):

- In order to maintain healthy populations these species require, amongst other factors, unpolluted water, undisturbed river banks and bankside vegetation and the absence of **artificial light**. Proposals for developments located near such habitats should not impact adversely on wildlife and on water quality and quantity. Ideally undeveloped river corridors should be maintained to achieve habitats suitable for species to thrive. The Environment Agency will need to be consulted on developments in areas of flood risk and those which may affect the water environment through water abstraction, discharges and runoff.

As part of our *Seeing Stars* campaign, the Snowdonia National Park Authority has developed a set of statements of intent which will be integrated into the LDP through the creation of Supplementary Planning Guidelines. The zones referred to in the following statements are defined within the accompanying LMP.

Plan Statement Number 1

The boundary between the second and third core is provisional and will be increased with a view to joining the two into one after further additional public consultation.

Plan Statement Number 2

Any new or replacement lighting within the Core Zone boundaries shown in Figure 2.3 should be fully cut-off (fully shielded - IDA term) regardless of light source lumen output.

Plan Statement Number 3

Residents in the Core Zone are to be encouraged to limit the visual perception of light output at their property boundary by adapting or modifying existing units to this end.

Plan Statement Number 4

Residential and business occupiers will be encouraged to recognise the benefits of switching off exterior lights after 22.00 hours.





Plan Statement Number 5

The Authority will endeavour to ensure that no lighting will be allowed to be projected from the adjacent light permitted buffer zones into the Core Zones and any overspill lighting from lights in the Critical Buffer Zone to be no greater than 0.05 lux (horizontal) at ground level or 0.05 lux vertical at 1 metre (or higher) above ground on the Core Zone side of the property boundary.

Plan Statement Number 6

Luminaires in the Buffer Zone using lamps greater than 600 lumens and operating continuously throughout the hours of darkness should be installed as a fully cut-off example.

Plan Statement Number 7

Residents are to be encouraged to limit the overspill light at their property boundary to no more than 0.1 lux.

Plan Statement Number 8

In Environmental Zone terms the residents round the Core Zone live with and enjoy intrinsic darkness and as shown in Table 1.1, equivalent to Environmental Zone E1. Towns within the Park boundary with a population greater than 1,000 may relax this Environmental Zone in the town centre where buildings provide natural screening but not in exposed locations.

Plan Statement Number 9

All new street lighting design will be based on a Glare Limiting Index of G6 and a light source colour temperature less than 4,500K.

Plan Statement Number 10

All new lighting should be designed and installed to provide lower glare or intensity values, where possible, than that recommended by the ILP for night time Environmental Zones.

Plan Statement Number 11

All design submissions and planning applications that include external lighting should show evidence of compliance with the zero candela intensity at 900 and above and encourage domestic luminaires to be selected from units having some form of upward light control.

Plan Statement Number 12

Through this LMP it will be possible to encourage developers, when required, to adopt and provide a lighting industry professionally prepared submission for planning consideration.

As stated in Section 2, the Park Authority has the power to control developments within the Park and therefore can ensure that new lighting installations do not increase light pollution by applying the Lighting Guidelines. However it does not have the power to require existing lighting to be upgraded. The Authority therefore relies on collaboration and persuasion, which is our preferred approach in any case. This is reflected in the wording of the Plan Statements above.

6.0 Letters of Support

Snowdonia National Park Authority *Seeing Stars* initiative is grateful for the continued support of numerous organisations and individuals including the His Royal Highness The Prince of Wales, the actor and comedian Jon Culshaw, the Brecon Beacons National Park, local astronomy groups and conservation organisations such as RSPB Cymru and the National Trust, the latter being a major landowner within SNP. A full list of letters of support can be found in Appendix 1.





7.0 The Snowdonia Seeing Stars Initiative's Anti Light Pollution Strategy

The objectives of the Snowdonia National Parks *Seeing Stars* initiative are:

- To combat further encroachment of light pollution into the Snowdonia National Park and the surrounding area;
- Mitigate the adverse effects of this pollution;
- Raise awareness and understanding of this special quality of the National Park and work alongside relevant groups in maximising benefits to local communities and business owners in the area.

These objectives are to be achieved through engagement with local communities, government bodies, and concerned organisations to form multiple partnerships to raise awareness of, and help address the issue of light pollution.

Partnerships/Supporters include:

- Cymdeithas Eryri/Snowdonia Society and other voluntary organisations
- Local astronomy societies
- Gwynedd Council and Conwy County Borough Council
- Campaign for Dark Skies
- Lighting Consultancy and Design Services Ltd
- Local community councils
- Residents of SNP
- Visit Wales

SNPA believe that gaining IDSR status will not only help raise the profile of the light pollution issue we face here in the UK, but also give us a means of acknowledging the quality of dark skies we possess in Snowdonia and giving long-term protection to this. It will bring economic benefits to the area by increasing astro-tourism to local businesses, particularly within the quieter winter months.



8.0 The Proposed IDSR

- Snowdonia National Park is split into a number of mountain ranges, the largest of which is the Snowdon massif to the north (encompassing the Glyderau and Carneddau mountains), with Y Rhinogydd and Cader Idris in central and south Snowdonia respectively. In addition to these main mountain ranges are a host of smaller hills and mountains, several large valleys with small towns, villages and hamlets dotted throughout. Very few areas of Snowdonia National Park are uninhabited, although some are less densely populated than others.
- When considering the above, the proposed zoning for the IDSR is as follows:
- Three Core Zones comprising of the most precious and darkest areas of the Park. These main core zone is located centrally within the Park, with smaller zones to the north and south;
- A set of Critical Buffer Zones which are adjacent to the Core Zones and represent the greatest threat to the dark skies of the Core;
- A Buffer Zone which is the remainder of the SNP.

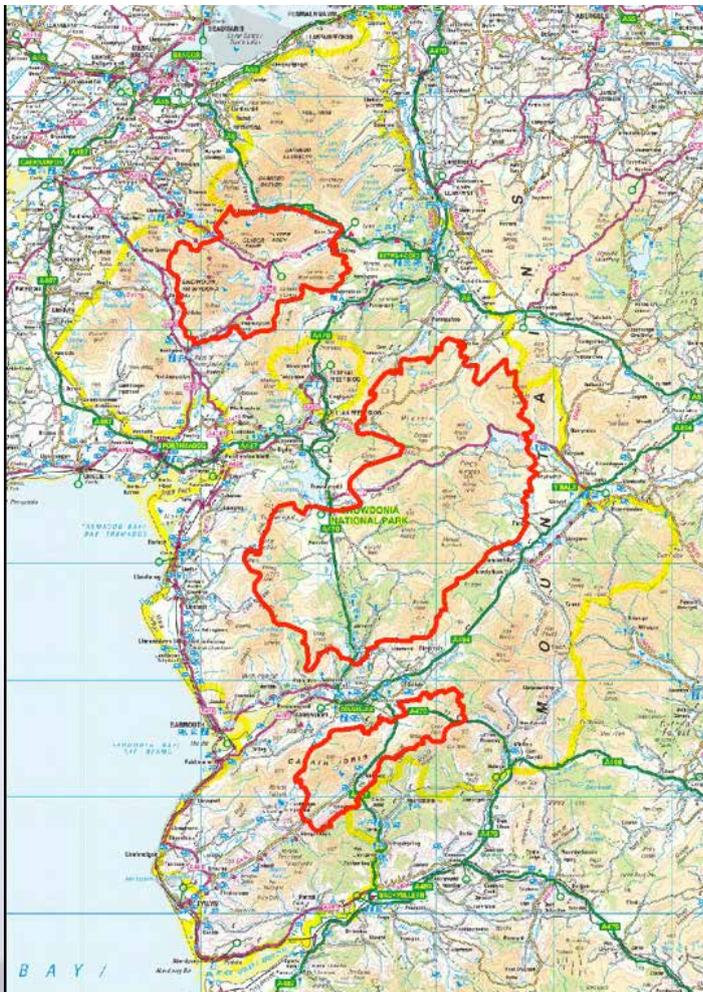
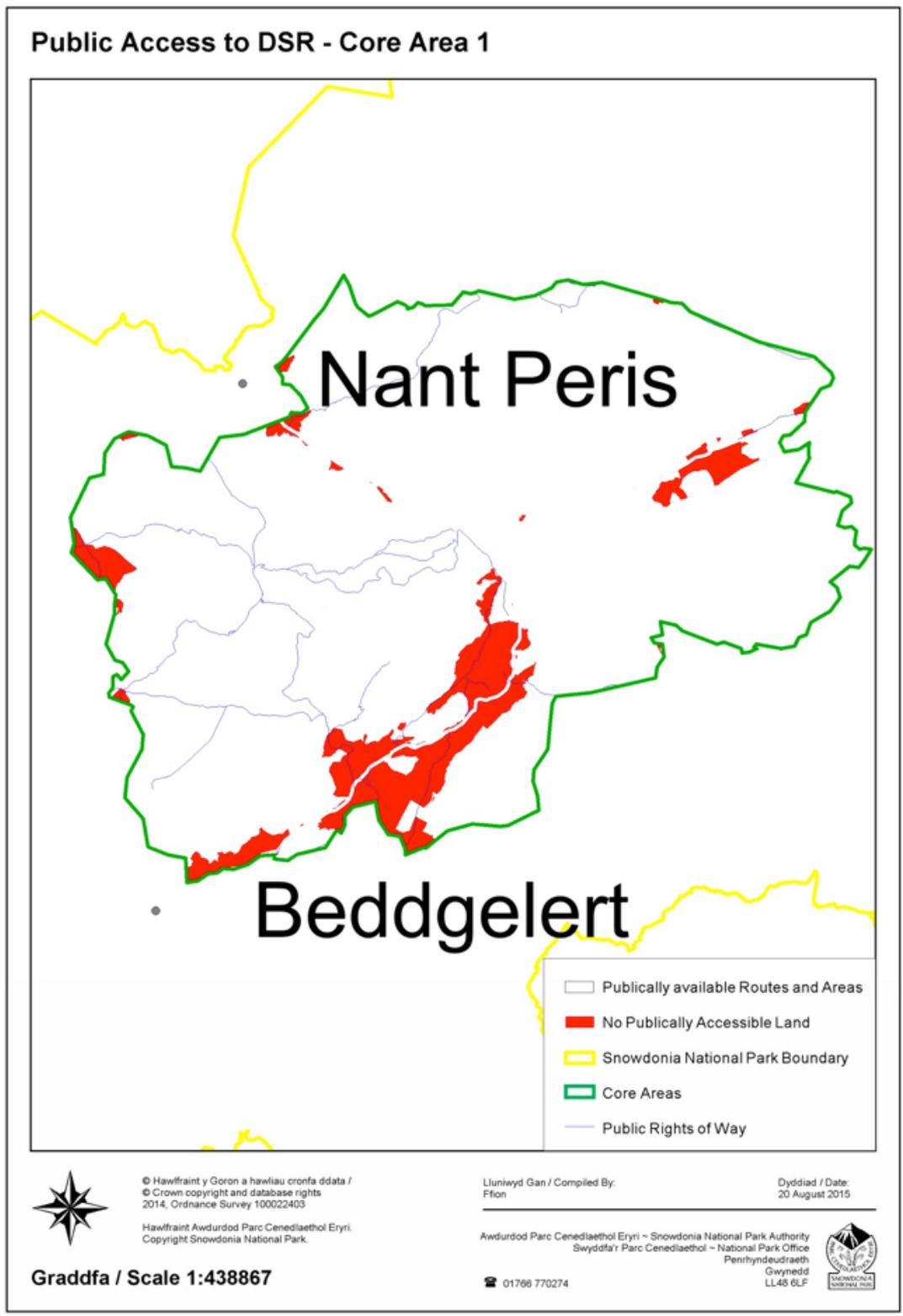


Figure 4:
Proposed Core
Zones for the
Snowdonia IDSR

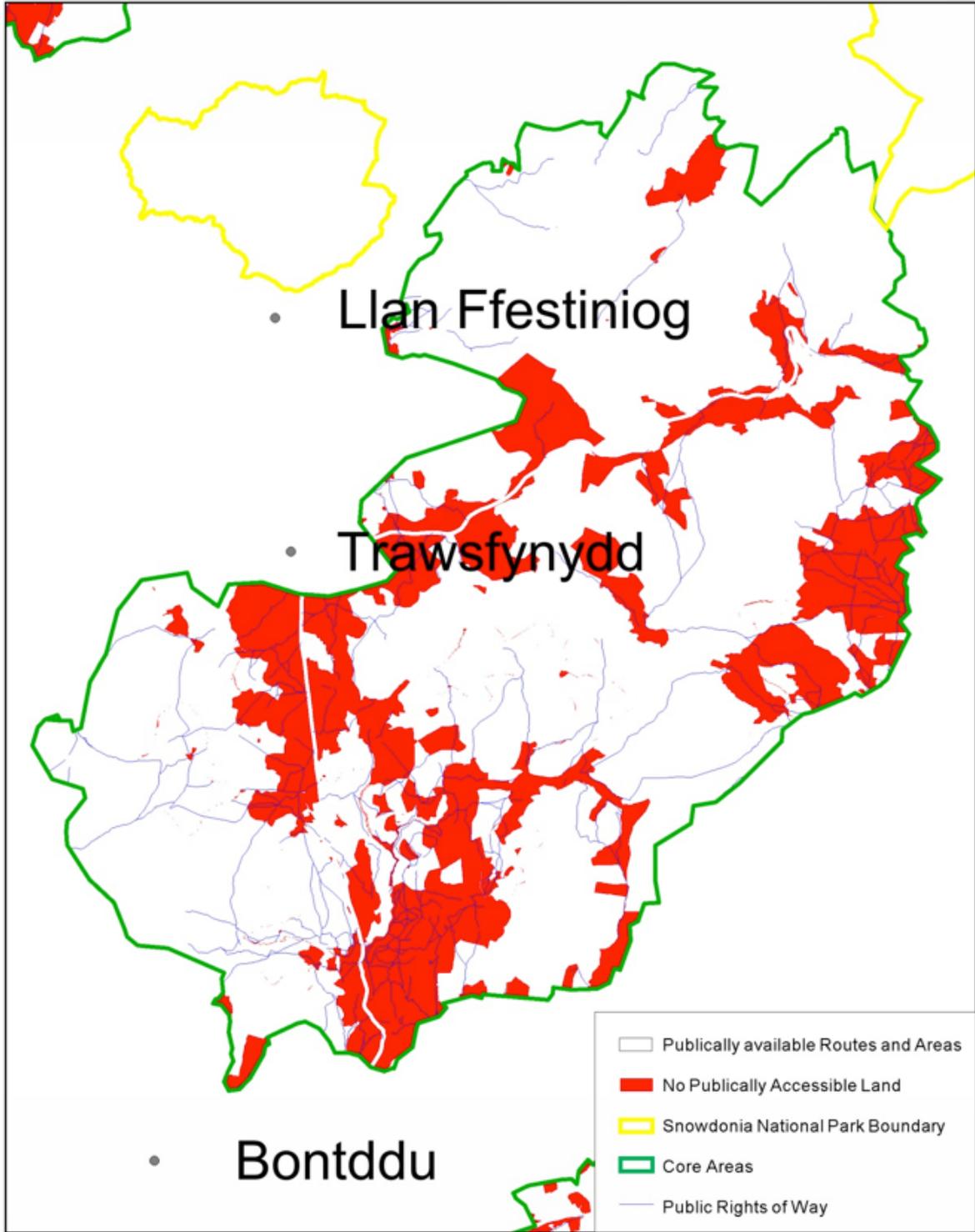


Due to the high levels of privately owned land within SNP, not all areas of the core zones allow for public access. However, large areas of each respective core zone are accessible to the public, either as a result of it being open access land, or due to the plethora of public roads or public rights of way (PRoW) which provide free and unrestricted access to the public to enter these areas. The maps below show the extent of publicly accessible land within each respective core zone.





Public Access to DSR - Core Area 2



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2014, Ordnance Survey 100022403

Hawlfraint Awdurdod Parc Cenedlaethol Eryri.
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Dyddiad / Date:
20 August 2015

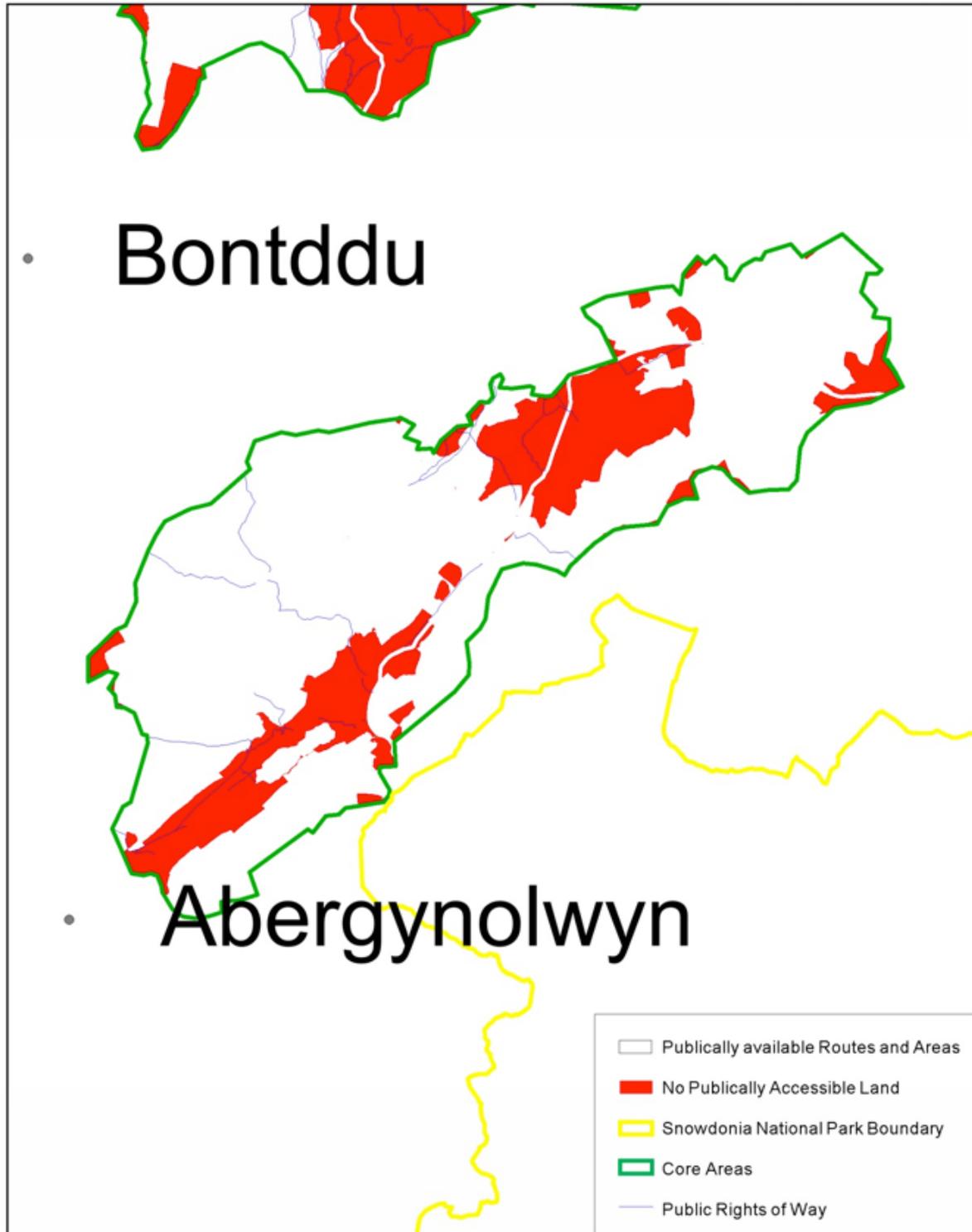
Awdurdod Parc Cenedlaethol Eryri ~ Snowdonia National Park Authority
Swyddfa'r Parc Cenedlaethol ~ National Park Office
Penrhyndeudraeth
Gwynedd
LL48 6LF

☎ 01768 770274





Public Access to DSR - Core Area 3



-  Publically available Routes and Areas
-  No Publically Accessible Land
-  Snowdonia National Park Boundary
-  Core Areas
-  Public Rights of Way



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Penrhyndeudraeth

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Gwynedd
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9.0 The Night Sky Quality Audit

The Night Sky Quality Audit for Snowdonia National Park was undertaken on a voluntary basis by SNPA staff and volunteers from Snowdonia Society. This survey gives a fair assessment of the quality of night sky quality within SNP and establishes a standard by which future surveys can be measured against.

9.1 Methodolgy

In total, night quality readings were taken at 57 locations throughout the Park, as shown in figure 5. These locations were scattered as evenly as possible in order to give a true reflection of the night quality within SNP, with no bias shown towards uninhabited areas. Measurements of the sky darkness were made at least 2 hours after local sunset on dates spread over a period of 6 months between October 2013 and March 2014. In addition, all readings were taken on evenings with little or no cloud cover, and when the moon was absent. A minimum of 3 readings were taken at each site in order to gain an average. Readings were taken using four separate Unihedron Sky Quality Meters (model SQM-L), which records the visual magnitudes per square arc-second over an area of approximately 42 degrees of sky. A total of over 270 readings were taken throughout the assessment process.

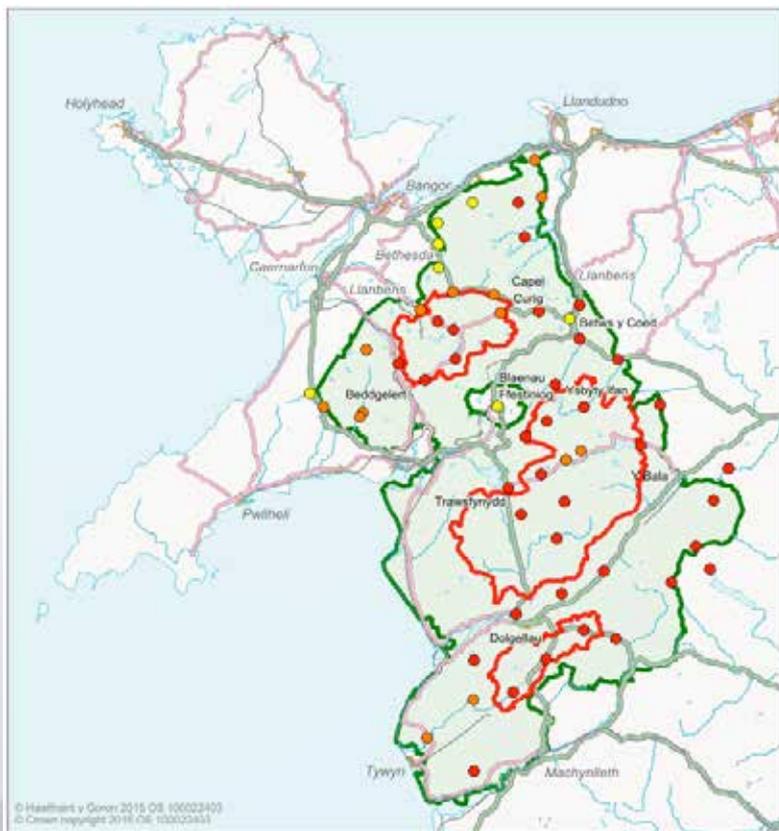


Figure 5: Location of dark sky quality survey points

Key:

- Red** – SQM readings over 21
- Orange** – SQM readings over 20
- Yellow** – SQM readings below 20

Figure 5: Location of dark sky quality survey points



9.2 Results

The faintest magnitudes recorded within the park boundary were at Bryn Celynog Farm, Cwm Prysor, and Pont Rhiwargor, Lake Vyrnwy respectively, with recordings of 21.69 on the meter resulting in a NELM of 6.47. No clear pattern was observed in respect of which areas had the better night sky quality, although as expected, readings taken at locations closer to the more populated areas such as Blaenau Ffestiniog and those to the north of the Park were generally lower.

The full set of results can be found in a table below. Please note that these readings are only included as a general comparison with other dark areas in the UK and should not be used as an absolute measurement value since the SQM meters used may not have been calibrated at the same time, the measurement methodology may have been different and the weather conditions will certainly have been different.

Darkest reading in Galloway Forest = 22.7 Darkest reading on the Isle of Sark = 21.5 Darkest reading in Exmoor = 21.8, Darkest reading Brecon Beacons = 21.57

Snowdonia National Park would appear to have dark skies standards comparable to other areas in the UK recognised by the IDA.

Site Name	Grid Ref	Avg SQM Reading	
Llyn Gwynant	SH648519	21.42	Core Zone 1
Llyn Dinas/Layby Hafod y Porth	SH610493	21.42	
Pen y Pass, Yr Wyddfa	SH647555	21.41	
Pont Gromlech	SH628567	21.37	
Llynnau Mymbyr, Dyffryn Mymbyr	SH706575	20.67	
Bryn Celynog, Cwm Prysor	SH753369	21.67	Core Zone 2
Argae Llyn Celyn, Frongoch	SH880403	21.50	
I fyny o Pont Aber-Geirw	SH771287	21.46	
Gwaith Dwr, ffordd Ysbyty Ifan	SH809453	21.43	
Ffynnon Eidda, Migneint	SH762437	21.39	
Maes Parcio, Cwm Cynfal	SH734417	21.31	
Ffridd Dol y Moch	SH782334	21.30	
Groesffordd ffordd Aber-geirw	SH726318	21.24	
Llyn Tryweryn, Cwm Prysor	SH784387	20.77	
Pont yr Afon Taihirion, Migneint	SH804397	20.70	
Maes Parcio Bwlch Llyn Bach	SH753136	21.63	Core Zone 3
Bwlch Oerdrws, Dinas Mawddwy	SH802170	21.33	
Tal y Llyn, Minffordd	SH710094	21.16	
Efyrnwy (Pont Rhiwargor)	SH963244	21.67	
Maestir	SH971332	21.63	
Cwm Hirnant, Bala	SH946273	21.62	
Bwlch y Groes	SH914227	21.62	
Llechwedd Hafod, Cwm Penmachno	SH774483	21.51	
Trac i fwrdd o Pont Fronwydd, A494	SH829245	21.45	
Y Ffynnon Arian	SH805539	21.40	
Hendre Isaf, A5	SH854512	21.39	

Ffridd Uchaf, Rhyd Ddu	SH576514	21.36	Within the reserve but outside of Core Zones (buffer)
Ty'n y Celyn, Dinas Mawddwy	SH842160	21.34	
Cilfan, Ffordd osgoi Trawsfynydd	SH711352	21.34	
Ystwmgwadnaeth	SH776217	21.31	
Pont Llanelltyd, Dolgellau	SH717193	21.29	
Ty Hyll, Capel Curig	SH756575	21.24	
Cadair Benllyn, Frongoch	SH906453	21.23	
Hafotty-fach, Arthog	SH663135	21.18	
Llyn Eigiau Reservoir, Dolgarrog	SH741672	21.16	
Cae Coch, Rowen	SH731714	21.11	
Cwm Maethlon, Machynlleth	SN658994	21.08	
A470, turning for Capel Garmon	SH807585	21.08	
Maes Parcio, Nant Peris	SH607581	20.98	
Craig Isallt, Cwm Pennant	SH531453	20.97	
Craflwyn, Rowen	SH762721	20.96	
Eglwys Llanfihangel y Pennant	SH526444	20.92	
Pont Afon Dysynni, Castell y Bere	SH660086	20.91	
Dafarn Faig, Pant Glas	SH479463	20.88	
Pont Dysynni	SH599038	20.78	
Tal y Braich, Dyffryn Ogwen	SH699598	20.72	
Bwthyn Idwal, Dyffryn Ogwen	SH647603	20.67	
Chwarel Simdde-dylluan, Drws y Coed	SH536533	20.53	
Sychnant Pass, Conwy	SH754768	20.52	
Bryn Hall, Llanllechid	SH629691	20.47	
Maes Parcio, Abergwyngregyn	SH675716	20.32	
Tai Newyddion, Nant Ffrancon	SH629636	20.01	
Canolfan ymwelwyr Betws-y-Coed	SH794566	17.82	
Byrgoed, Llandderfel	SH989371	21.32	Outside of Snowdonia National Park boundaries
Lon Eifion, Chwarel Bryncir	SH464482	20.44	
Gerlan, Bethesda	SH631664	19.64	
Blaenau Ffestiniog	SH700457	17.80	

Figure 6 – results of the dark sky quality surveys for Snowdonia National Park

9.3 Conclusions

The results of our survey show that Snowdonia National Park has very good night sky quality with a best SQM measurement of 21.69. This is especially remarkable as the Park itself has a population of 26,000 within its boundaries, with many more living within the larger towns in close proximity to the National Park. With so many people visiting Snowdonia each year, and due to the National Parks proximity to the large cities such as Liverpool, Manchester and Birmingham, we believe that SNP has considerable potential for dark sky tourism.

Dark Sky results using the Minimum Curvature methodology

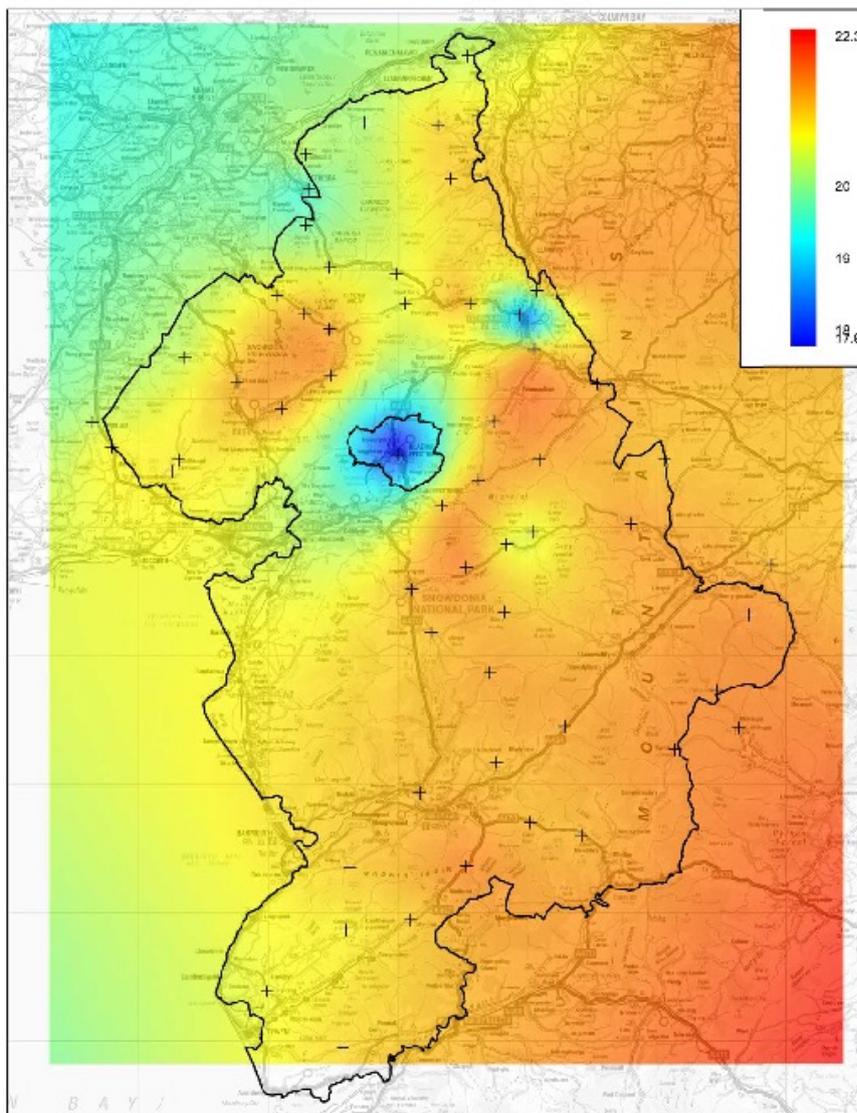


Figure 7: : theoretic SQM values for the whole of Snowdonia National Park using the Minimum Curvature methodology and based on actual readings, as listed in Figure 5.

The interpolated surface generated by Minimum Curvature is analogous to a thin, linearly-elastic plate passing through each of the data values with a minimum amount of bending. Minimum Curvature generates the smoothest possible surface while attempting to honor your data as closely as possible. Minimum Curvature is not an exact interpolator however. This means that your data is not always honored exactly.



10. The External Lighting Audit

Lighting Consultancy and Design Services Ltd (LCAD) were commissioned to undertake both a lighting audit and to produce a lighting master plan on behalf of the SNPA dark skies application. The master plan forms an appendix to this application document. LCAD Ltd has extensive experience of working on dark skies projects, having worked alongside both the Brecon Beacons and Exmoor National Park amongst others as part of their own dark skies endeavours.

In order to evaluate the potential for light pollution beyond the obvious town locations like Bala and Dolgellau a domestic lighting audit was undertaken for properties within the three core areas and in the immediately surrounding critical buffer area which includes Bala, Dolgellau and other small towns or villages. The results showed that the compliance percentage within the proposed core zones and buffers are equivalent to other UK Dark Sky applications even although there were many more lighting units included than in any other dark sky lighting audits.

The survey contained data from domestic and commercial properties and when analysed, the combined compliance percentage equated to 69%. However at least 210 (over 6%) of the “non-compliant” floodlights are connected to presence detection devices and may not therefore be providing continuous illumination.

Figure 6 contains an overall picture of the compliance variations for each of the survey sections. Each section contains, generally, about 20 to 30 properties and has been devised this way to provide an early indication of where future action should be targeted to increase the compliance level in progressive years. The lowest compliance (25%) is in Capel Curig, largely due to Plas y Brenin National Mountain Centre, which is located within Core Zone 1. The property has a large quantity of outdated external lighting. Early discussion have already taken place with Plas y Brenin in respect of amendments, which have been very positive.

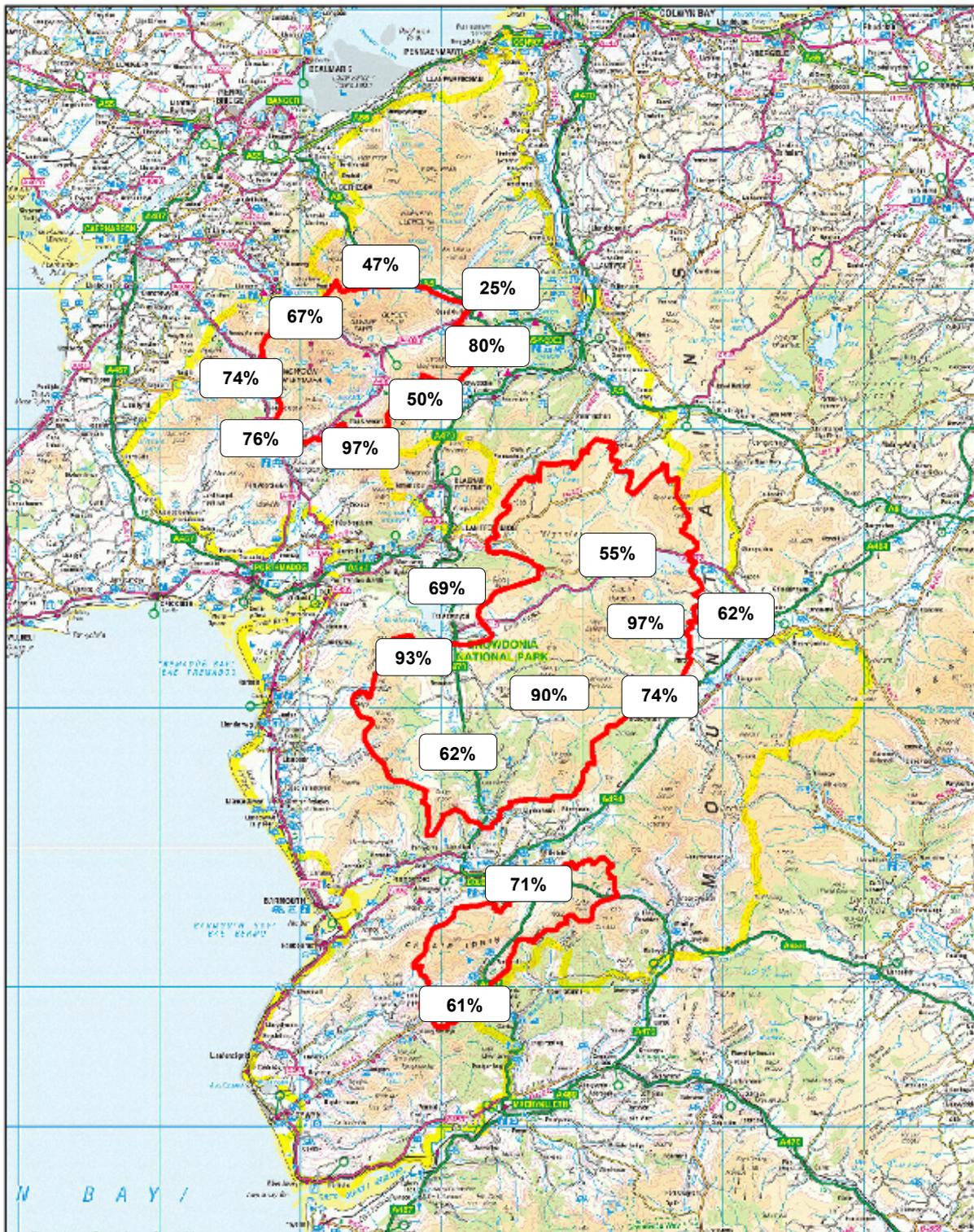
Full details including results of the lighting audit can be found in section 5 of Appendix 1.



Photograph taken of Dolgellau during night time hours.



Lighting compliance



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 Penrhyneddudoch



Figure 8 - Private lighting percentage compliance variation for the proposed core zones



11. Lighting Management

As previously stated, National Park Authorities in the UK are empowered to control developments within their boundaries. SNPA will develop external lighting guidelines for use by their Planning Department (and by Developers). The application of these guidelines to all future development applications will ensure there is no further increase in Light Pollution within the Park.

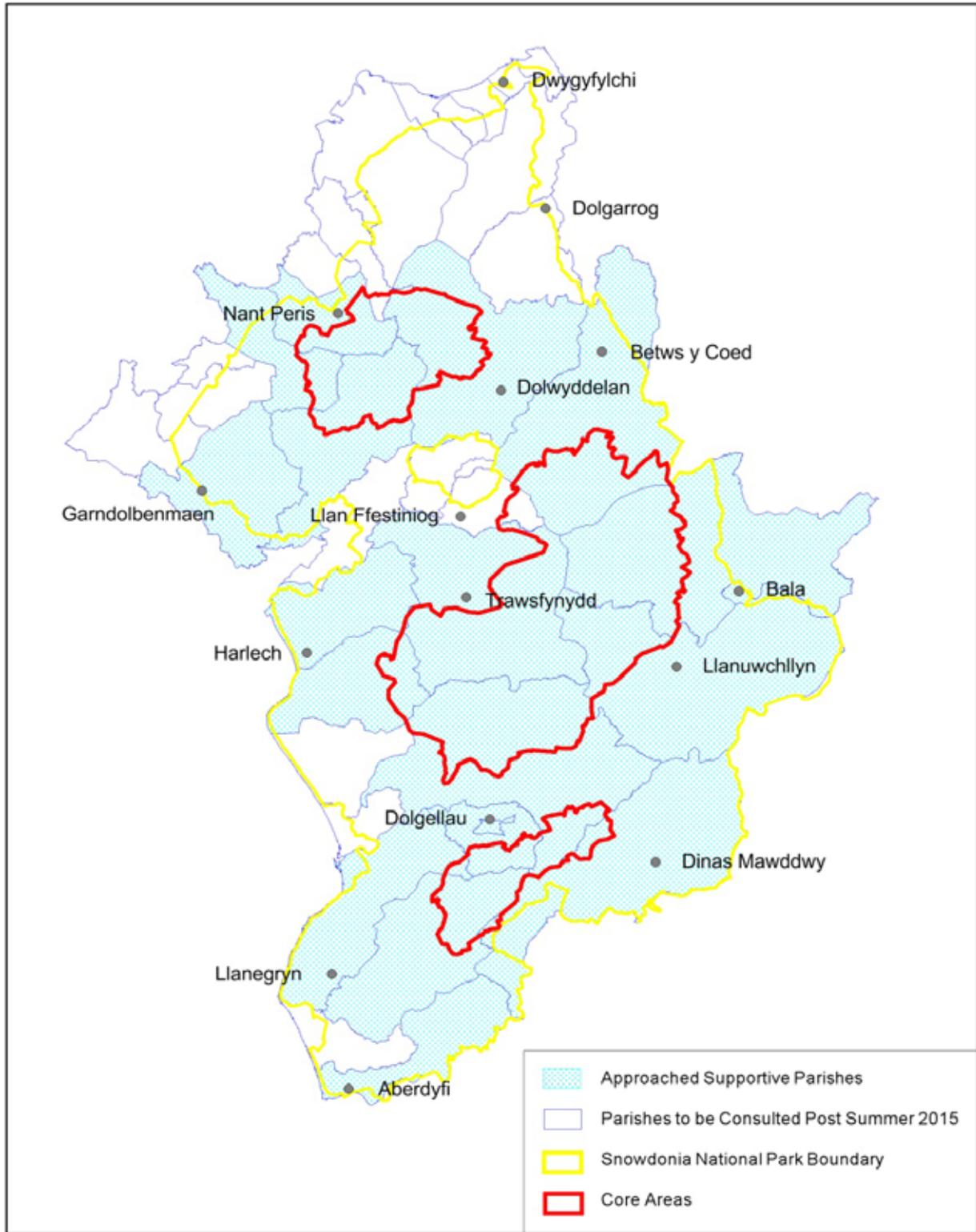
In the UK, policy decisions are undertaken at a county level, and therefore community councils are unable to set out specific policies for their respective parishes. Consequently, meeting requirement A of the IDSA eligibility criteria (LMP to be adopted by a minimum of 80% of communities within the DSR) has proved challenging for SNPA. However, as referred to throughout the application document, both local Authorities whom are responsible for public lighting within SNP (Conwy and Gwynedd) have shown their full backing to the project, as indicated by the letter of support in Annex I. SNPA are collaborating with both these Local Authorities and other Government organisations to encourage the adoption of guidelines similar to those proposed by SNPA in areas adjacent to the Park, particularly within Blaenau Ffestiniog (which forms an island within the National Park). It is also worth noting that all communities get an opportunity to feed into the policy forming process during the statutory consultation periods for the respective statutory plans for the National Park; Snowdonia National Park Management Plan 2010 - 2015 and the Eryri Local Development Plan 2007 – 2022 respectively, the latter of which is subject to a public audit prior to adoption.

The Snowdonia National Park Authority does not have the statutory power to force individuals, organisations, businesses or local government to replace existing non conformant external lighting. A strategy of education and persuasion is therefore necessary. Indeed we believe this approach is preferable as it will both raise the awareness of the problem of Light Pollution and increase the buy in to finding solutions both now and in the future.

The application has been supported and passed by the Authority, which constitutes councillors that represent the entire National Park and their individual communities. Furthermore, it is also supported by the two local government Authorities with the Park boundaries, who are Gwynedd and Conwy respectively. They are responsible for street lighting within their respective counties, and are already actively undertaking a programme of works to replace existing light fittings with those that are compliant.

(For full details please see the Lighting Management Plan which accompanies this application)

Community Supported Parishes within SNP



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Figure 9: Map showing the parishes within SNP boundaries and surrounding area which have given their support and commitment to the Seeing Stars campaign.



12. Communication and Collaboration

Throughout the application process, SNPA have endeavoured to communicate the key messages

12.1. Media Coverage and Publicity

The Seeing Stars campaign has received widespread media coverage, both locally and nationally since the initiative was first announced. These are shown in the below table:

Date	Programme	Media
2 nd February 2015	Dylan Jones Programme, BBC Radio Cymru (Radio Wales)	Radio
7 th February	Galwad Cynnar, Welsh language radio show, BBC Radio Cymru (Radio Wales)	Radio
17 th February	Post Cyntaf, Welsh language radio show, BBC Radio Cymru (Radio Wales)	Radio
18 th February	Jason Mohamed Show, BBC Radio Wales	Radio
	Welsh News, S4C	Television
	Good Morning Wales, BBC Radio Wales	Radio
19 th February	Good Evening Wales, BBC Radio Wales	Radio
9 th June	HTV Wales Evening News	Television



In addition to radio and TV appearances, several articles have been published in local and national newspapers and other publications, including:

- Full feature spread in the Daily Post, 5th May 2015;
(<http://www.dailypost.co.uk/news/north-wales-news/snowdonia-park-dark-sky-status-9187508>)
- Y Dydd, Welsh language publication, article February 2015 edition;
- Y Cymro, Welsh language newspaper, article 6th February 2015;
- Daily Post, newspaper for north Wales, article 6th February 2015;
- Featured article in *Natur Cymru* journal, spring 2015;
- Published article in Rural Wales Magazine, spring 2015 edition;
- Coverage on HTV Wales new website, 19th February 2015; <http://www.itv.com/news/wales/update/2015-02-19/snowdonias-dark-skies-status-bid>
- The Great Outdoors Magazine, February 2015;
<http://www.tgomagazine.co.uk/news/snowdonia-to-apply-for-dark-sky-reserve-status>
- Mud and Routes website, February 2015;
<http://www.mudandroutest.com/archives/35145>

And of course, all of the above doesn't take into account the 4,500+ followers that SNPA have on Facebook and Twitter, which would have received updates on the project as it developed over the last 18 months.

Whilst outside of the National Park boundaries, the below article refers to a project Conwy County Borough Council have undertaken on the Great Orme, Llandudno, in order to improve mating conditions for glow worms. Whilst the story gained national coverage, it highlights the commitment given by Conwy County Borough Council to improve external lighting conditions for the benefit of native wildlife, whilst providing associated benefits in terms of sustainability and light pollution also.

The screenshot shows a news article from the Daily Post. At the top, there is a navigation bar with 'Most read', 'What's on', and various news categories like 'News', 'Sport', 'Football', 'Wrexham FC', 'Business', and 'In Your Area'. Below this is a 'TRENDING' section with topics like 'FLINTSHIRE', 'WREXHAM', 'CARWYN JONES', 'NORTH WALES POLICE', and 'A55'. The article itself is by Bryan Davies & Associates, dated 11:00, 9 AUGUST 2015, and written by Jez Hemming. The headline reads: 'Council switches off street lights that were 'interfering with glow worm sex''. The sub-headline states: 'Males were being tempted away from females by sodium lights, but population on Great Orme booms after LEDs brought in'. There is an advertisement for 'ARVONIA' Coach Holidays, Short Breaks & Day Excursions on the right side of the article.



12.2. Education and Events

Every summer, SNPA arrange a Biodiversity Roadshow to coincide with Wales Biodiversity Week, which is usually held in the first week of June. In 2015, the theme was 'The Nocturnal Environment' to go alongside our *Seeing Stars* campaign.

A host of activities were arranged for the pupils, including a look at some of our most charismatic nocturnal creatures (owls, live bats, moths), experimenting with different light fittings to determine their energy usage and suitability for use in an IDSR, and a planetarium was hired in order to showcase the astronomic wonders which can be observed from Snowdonia. In total, over 300 pupils attended over the course of the three days, from a total of 15 schools. We will look to repeat this to a public audience in 201

In total, over 300 pupils attended over the course of the three days, from a total of 15 schools. We will look to repeat this to a public audience in 2016.

In addition to the school events, a conference was held at SNPA's study centre, Plas Tan y Bwlch, in February 2015 where a host of guest speakers were invited to give presentations on a range of topics in relation to our *Seeing Stars* campaign. Topics covered included astronomy, sustainability, ecology and astro-tourism, the four main strands to SNPA's initiative. The conference was very well attended, with over 70 delegates in total from a host of organisation including local Authorities, those from the tourism sector, astronomy clubs, farmers unions, ecologists and the general public.

Following on from the conference, six open evenings were held at differing communities around the Park during February and March 2015. The communities targeted were those which were located within, or close to, the boundaries of the core zones, including Capel Curig, Beddgelert, Ysbyty Ifan, Trawsfynydd, Bala and Dolgellau. These were well attended, and gave SNPA staff involved with the *Seeing Stars* initiative the opportunity to engage with a wider audience, highlighting the benefits which can be achieved from gaining ISDR status and allay any worries residents may have had in respect of gaining this prestigious award.



12.3. Local Government and Community Councils

Discussions have been undertaken with the relevant local Authorities responsible for street lighting within Snowdonia National Park. These are Gwynedd County Council and Conwy County Borough Council. Both councils have their own planning policies relating to light pollution (Note: In the parts of their counties that are inside the SNP the Park's Planning policies are superior and replace those of the county).

Both local Authorities have shown their support towards the project (see section 6.0) and are committed to work alongside SNPA in reducing light pollution where possible in future years.



In respect of Community (Parish) Councils, SNPA have undertaken an outreach programme including inviting representatives from each parish to attend the aforementioned open evenings, extending an offer to attend community council meetings in order to discuss aspects of the project, and sent out a brief flyer on the Seeing Stars campaign to each parish to circulate amongst local residents, a copy of which can be seen below.

12.4. Other

Pembrokeshire Coast and Snowdonia National Parks) to Visit Wales for funding to develop the 'Dark Skies' brand. Included in the bid is money for:

- Developing a Dark Skies brand for National Parks Wales;
- Providing training to those who wish to become Dark Skies ambassadors for their respective regions;
- Development of events;
- Production of a short on-line dark skies promotional film and joint webpage for the Dark Skies Wales brand.

In addition to the above, SNPA are in discussions to develop an observatory within one of the core zones (likely to be core zone 2) within a National Trust property which is currently abandoned.



Pictures from Snowdonia National Park Biodiversity Roadshow 2015, where the theme was *The Nocturnal Environment* to coincide with our Seeing Stars campaign.





Seeing Stars: Dark Sky Reserves status for Snowdonia



What is a Dark Sky Reserve?

This is a prestigious award given by the International Dark Sky Association to select destinations that have proven that the quality of their night air is outstanding and that real efforts are being made to minimise light pollution.

So why is it important?

Light pollution in the UK has increased significantly in recent years. Between 1993 and 2000, light pollution increased by 24% in the UK, and over 90% of UK population now live under a highly polluted sky. As light pollution increases, the opportunities to enjoy the night sky and its stars are declining. Excessive or inappropriate lighting can have multiple adverse impacts on both humans and the natural environment. These include:

- Sleep deprivation and stress amongst those who have light intrusion into their homes;
- Prolonged exposure to high levels of artificial light can impact on melatonin levels in humans, which in turn can lead to increased risk of cancer;
- Increase energy bills for both Local Authorities and individuals through the use of inefficient and excessive lighting;
- An adverse impact on nocturnal wildlife including species of mammals, invertebrates and birds. Examples include disturbance to the migratory routes of bats (of which there are thought to be 12 species residing in Snowdonia), increased mortality in moth populations, and decreased ability to mate amongst certain bird species e.g. blackbirds;
- Impair the enjoyment of the night time landscape for both star gazers and other recreationists who undertake outdoors activities during night time hours. Amongst its statutory duties, the National Park Authority is expected to conserve and enhance the natural beauty and wildlife of that area. We firmly believe that these principles should be applied to the night time environment as well as what we see during daylight, giving people a sense of place and well being whenever they chose to enjoy the outdoor environment.

Luckily, surveys show that we still have large areas with good quality dark skies here in Snowdonia, particularly in the more rural areas that lie away from the more populated coastal areas. This is reflected by the proposed location of the three 'core zones', as identified by the accompanying map.



Will new developments not have lights?

If successful with our bid to designate Snowdonia National Park as an IDSR, we expect related supplementary guidance on external lighting to follow in due course. However, this will apply to new applications only, and not to existing developments. It will specify the need for responsible external lighting on new developments and not stipulate the absence of external lighting altogether. There will be a greater focus on new developments within the proposed core zones, which are generally scarcely populated and located away from the larger towns and villages in Snowdonia.

Will the streets be less safe?

We appreciate that human safety is of paramount importance, and this will be at the forefront of any future changes. Modern LED street lighting coupled with good design works just as well, if not better, than traditional sodium burning street lamps with their orange glow. If the levels of street lights are to be dimmed during unsocial hours, as many Local Authorities have done elsewhere in the UK, this will only be done where safe to do so and following consultation with the local community.

What does it mean to me?

At present, very little. As outlined above, any changes would be voluntary other than obligations on new developments. And even then, the Authority will be asking for responsibly designed external lighting, rather than refusing lighting altogether. We wish to promote the opportunities available to local businesses and communities through the project such as an increased tourist market and longer tourist season, based on astronomy, particularly during the quieter, winter months.

So what does all this mean to the residents of Snowdonia?

Snowdonia National Park Authority wishes to work alongside local communities and the relevant Local Authorities in maintaining the quality of dark skies we have in Snowdonia, as well as improving the situation where required. This will primarily be done on a voluntary basis by better managing lighting, and encouraging businesses and private residences to use appropriate external lighting around their properties. In addition, we hope to provide opportunities for local business owners to benefit from the designation by training so that they may become Dark Skies Ambassadors for Snowdonia, thus further increasing their potential to attract tourists during the quieter winter months.

If successful in its bid, Snowdonia, along with the Brecon Beacons, will then officially hold a badge as an International Dark Skies Reserve (IDSR) here in Wales. That accounts for approximately 17% of the land area of Wales, making it the country with the largest area officially designated as an IDSR anywhere on earth!

FAQ

Will I have to switch off my lights?

Put simply, no. We are not able to force people to make changes to their existing external lighting, nor would we wish to do so. Rather, we hope to encourage people to use less and/or more appropriate lighting as and when necessary. Examples would include using fully shielded lamp heads that direct light downwards only, or using lighting which only comes on temporarily when detecting motion (PIR lighting).

Proposed Core Zones



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Snowdonia National Park Council Welsh Dydd
Cwmwllewydd Dark Sky Reserve

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Dyddiad / Date:

27.10.2014
Snowdonia National Park Council Welsh Dydd
Cwmwllewydd Dark Sky Reserve
01491 810000

Dark Sky Reserves status for Snowdonia

Image / Photos: iStockphoto

Information sheet sent to all Community Councils promoting the Seeing Stars campaign





Visit Wales

In September 2015, Snowdonia National Park was successful in gaining £50,000 from Visit Wales to develop the Dark Skies brand further in Wales. This was a joint application with the other National Parks in Wales, lead by Pembrokeshire Coast National Park Authority. With the funding, several elements of work will be undertaken, including:

- Designing a logo and developing branding of Dark Skies in Wales
- Developing a web portal for Dark Skies Wales
- Produce promotional video
- Development of a training manual for Dark Skies Ambassadors
- Undertake training events

This work will be completed by March 2016, with further funding being sought to develop the Dark Skies Wales brand further over the next 5 years.



13. Lighting Improvements

In respect of lighting improvements in and around the Snowdonia National Park, the focus will be on:

- Problem areas within the Core Zone and Critical Buffer Zones (i.e. those that have the largest impact on the darkest areas of the Park);
- Street Lighting - the largest overall contributor to light pollution in the Park

The Snowdonia National Park Authority does not have the statutory power to force individuals, organisations, businesses or local government to replace non conformant external lighting. Consequently, a strategy of education and persuasion is therefore necessary in order to realise the required changes. Indeed we believe this approach is preferable as it will both raise the awareness of the problem of light pollution and increase the buy in to finding solutions both now and in the future.

Due to the large number of properties present within the proposed core zones and respective buffer zones, it is difficult to make comments in relation to individual properties. However, as eluded to in section 10, positive discussion have been undertaken with the owners of properties which are deemed to be problem areas in order to facilitate collaborative working in the future to improve the situation.

The Core Zone Lighting Improvement Plan

The external lighting audit found a 69% compliance level for the external lighting within the proposed core zone, which are equivalent to other UK Dark Sky applications even although there were many more lighting units included than in any other dark sky lighting audits. However at least 210 (over 6%) of the "non-compliant" floodlights are connected to presence detection devices and may not therefore be providing continuous illumination.

The plan to get the Core Zone up to a minimum of 80% compliant within 5 years is to continue through the usage of Social Development Funds, internal and external funding streams. The first focus areas will be public buildings where we can provide interpretation and information on what's been done and why so that our engagement and education works reach a wider audience. Due to the significant amount of households within the core zones, it is imperative that the Authority works with the communities and residents to change their lifestyle to incorporate dark sky friendly practices of their own accord.

The education and encouragement strategy that has been employed so far in the SNPA's Seeing Stars campaign will also be continued for years to come. The work stream is being incorporated into the new Education Strategy and Communication Strategy which are currently being developed (August 2015) so that the fundamental principles and objectives of the Seeing Stars campaign are ingrained throughout the whole Authority and becomes synonymous with the educational work and the messages relayed by the Authority and its staff and members.



Street Lighting

The Snowdonia National Park Authority does not have responsibility for, or control over, street lighting within the National Park boundaries. This lies with the Local Government (County Councils) for the Counties whose boundaries overlap that of the Park, which are Gwynedd and Conwy respectively. As a result work on street lighting has focussed on these two Counties, and has addressed both the lights inside the Park and in the areas of those counties outside the Park boundary.

There are two strands to the reduction in Light Pollution from street lighting, which are:

- Replacement of existing lights with poor light pollution characteristics by more appropriate and effective equipment
- Turning off, dimming, or part night lit operation of existing lights

For some time SNPA has been in discussion with local government lighting engineers to learn about their plans and to help influence their thinking on light pollution. Discussions have been both encouraging and constructive, with both local Authorities showing willingness to work alongside SNPA in our Seeing Stars campaign. Indeed, where street lighting is currently being replaced within Snowdonia, traditional sodium burning light fittings are being replaced with fully shielded LED heads (see map below). Examples would include (estimated numbers):

Pant Glas: 8 lamps
Garn: 2 lamps
Tremadog: 25 lamps
Penrhyndeudraeth: 35 lamps
Fron Goch: 10 lamps
Ganllwyd: 15 lamps
Bronaber: 8 lamps
A55 Penmaenmawr: 60 lamps (double)
Mynydd Llandegai: 20 lamps

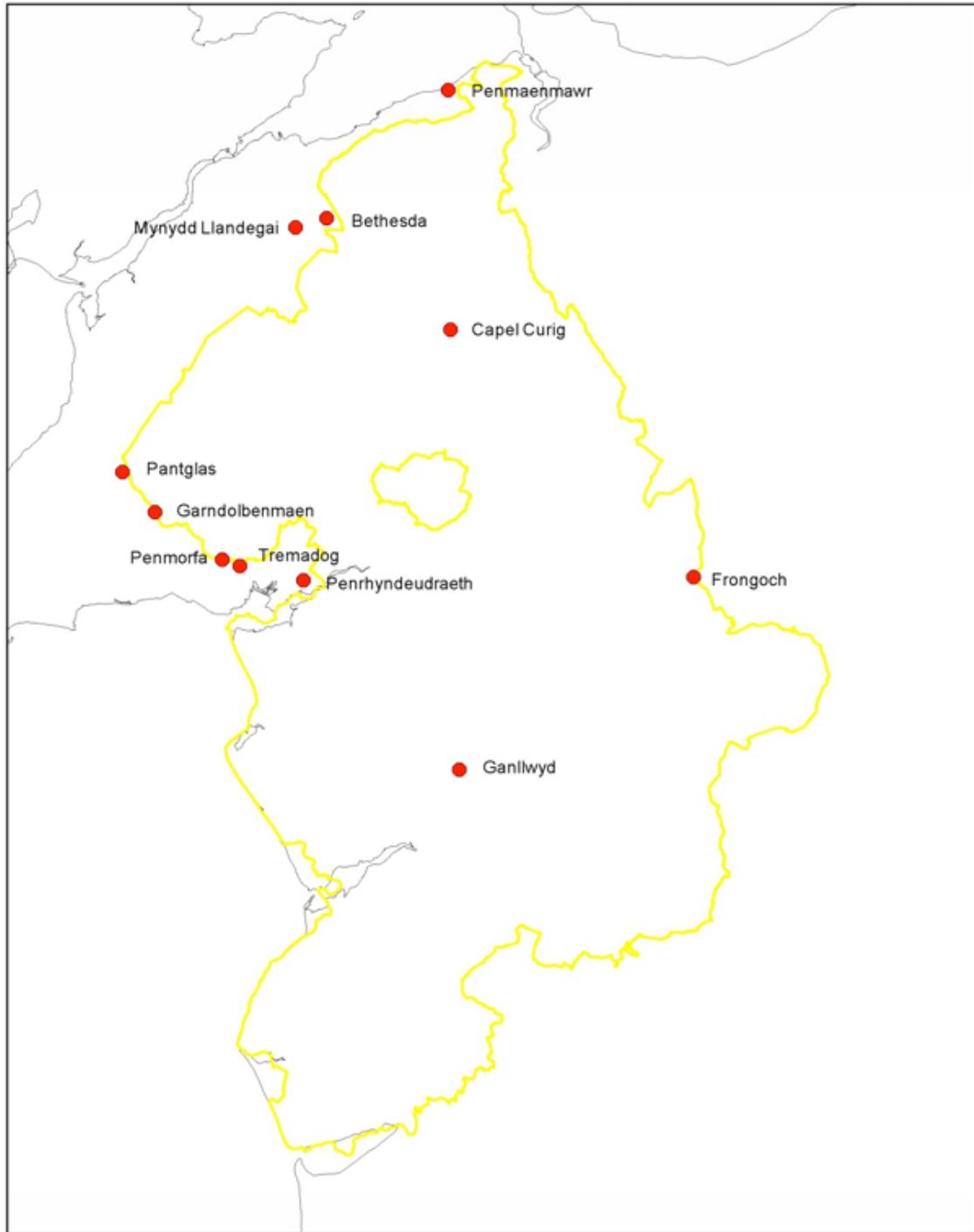
This programme of works will continue indefinitely, with both local Authorities indicating a willingness to focus works on areas which coincide with the proposed core zones.

In addition, Conwy have been in discussions with some local communities such as Ysbyty Ifan about the possibility of dimming street lighting during evening hours. These discussions are still on-going as of July 2015, but it is hoped that changes can be implemented in the very near future. It is hoped this project will act as an exemplar to other communities to follow suit in the future.





Gwynedd and Conwy Public Lighting Replacement Works



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Awdurdod Parc Cenedlaethol Eryri ~ Snowdonia National Park Authority
 Swyddfa'r Parc Cenedlaethol ~ National Park Office
 Penrhyndeudraeth
 Gwynedd
 LL48 6LF

☎ 01786 770274



Communities within Snowdonia National Park (and periphery) where street lighting has been changed from traditional sodium burning light fittings (orange glow) to modern, LED light fittings (ISDA compliant).



14. The Future

If successful in gaining IDSR status, SNPA will continue its programme of engaging with all interested stakeholders including the residents of SNP, local Government, astronomy groups, relevant tourist boards and other relevant partners to ensure the on-going success of the Seeing Stars campaign. This will include a formal long-term monitoring plan of dark sky quality within the reserve, to be lead by SNPA staff in conjunction with key partners such as volunteers and local astronomy groups. **We propose that each site that was surveyed as part of the initial application (as listed in Figure 6) will be re-visited at a minimum of once every three years, with all 18 survey sites located within core zone areas re-surveyed annually.** Furthermore, we will continue to add new sites to the list to fine tune the dark sky quality map and data that we have for the Park area, and hopefully expand our influence to our neighbouring areas.

The 'buzz' that has been created throughout the consultation period has reinforced our belief that what we're trying to achieve is worthwhile, and something we're eager to build on in the future. We believe that the substantial benefits associated with gaining such a prestigious status will not only profit residents and visitors of Snowdonia socially and economically, but also improve the local environment to the benefit of all. Additional areas have expressed a interest in possibly expanding on this reserve in the future should our application be successful.



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