Discovery in the Dark Wales

Night Time Adventures

a toolkit for the trade

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DISCOVERY IN THE DARK – WALES

NIGHT TIME ADVENTURES – A TOOLKIT FOR THE TRADE

CLIENT: PEMBROKESHIRE COAST NATIONAL PARK AUTHORITY ON BEHALF OF BRECON BEACONS NATIONAL PARK AUTHORITY AND SNOWDONIA NATIONAL PARK AUTHORITY

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CONTENTS

| 1 | Introduction | 1 |
|-----|---|----|
| 1.1 | Dark Skies | 1 |
| 1.2 | Dark Skies For Businesses | 3 |
| | 1.2.1 Sustainable Tourism | 4 |
| 1.3 | Activities and Adventures Development Process | 4 |
| | 1.3.1 Trade Consultations | 4 |
| | 1.3.2 Stakeholder Survey | 4 |
| | 1.3.3 Visitor Survey | 5 |
| | 1.3.4 Workshop | 6 |
| 1.4 | Marketing And Branding | 6 |
| | 1.4.1 Marketing | 6 |
| | 1.4.2 Website | 6 |
| | 1.4.3 Branding | 8 |
| 2 | Activities And Adventures | 10 |
| 2.1 | Safety advice | 12 |
| 2.2 | ACTIVITIES AND ADVENTURE IN PROTECTED PLACES | 14 |
| 2.3 | Astronomy Activities | 14 |
| | 2.3.1 All Year Dark Sky Astronomy | 14 |
| | 2.3.2 Periodic Dark Sky Astronomy | 19 |
| | 2.3.3 Astronomy Society Events | 23 |
| 2.4 | Physical Activities And Adventures | 25 |
| | 2.4.1 Moonlit Walks/Night Walking | 25 |
| | 2.4.2 Night Trail Running | 28 |
| | 2.4.3 Night Mountain Bike Adventure | 30 |
| 2.5 | Cultural/Historical Activities And Adventures | 33 |
| | 2.5.1 Dark Skies Camping | 33 |
| | 2.5.2 Sunrise and Sunset Adventure | |
| | 2.5.3 Night Train Ride Adventure | 38 |
| | | |

| | 2.3.4 Night Filotography | 40 |
|------|---|----|
| | 2.5.5 Welsh beacons and bonfires | 42 |
| 2.6 | Nature Activities And Adventures | 44 |
| | 2.6.1 Bat Walks | 44 |
| | 2.6.2 Glow Worm Adventure | 48 |
| | 2.6.3 Badger Watching Adventure | 51 |
| | 2.6.4 Nocturnal Birds Listening adventure | 54 |
| 3 | Dark-Skies-Friendly Business Initiatives | 59 |
| 3.1 | Training | 59 |
| 3.2 | Advice | 59 |
| 3.3 | Measuring Dark Skies | 60 |
| 3.4 | Planning Guidance For Lighting | 60 |
| 3.5 | Nocturnal Wildlife Enhancement | 61 |
| | 3.5.1 Effects of Light Pollution on Wildlife | 61 |
| | 3.5.2 Provision of Owl Nest Boxes | 61 |
| | 3.5.3 Provision of Bat Boxes | 61 |
| Appe | endices | 62 |
| Appe | endix A – Additional Activities and Adventures | 62 |
| Appe | endix B – Visit Wales Independent Explorer Market Segment Definitions | 63 |
| Appe | endix C – Visitor Survey Questions | 64 |
| Appe | endix D – Visitor Survey Results | 65 |
| Appe | endix E – Trade Questionnaire | 70 |
| Appe | endix F – Workshop | 71 |



TABLES

| Table 1 – Potential Business opportunities related to Dark Sky activities. Indirect links are given in brackets. | 11 |
|--|----|
| Table 2 – Meteor shower peak dates | 20 |
| Table 3 – Astronomy Societies operating within or nearby to the Welsh National Parks | 23 |
| FIGURES | |
| Figure 1 – Process used to develop the suite of activities and adventures | 4 |
| Figure 2 – 'Discovery in the Dark - Wales' website (credit: Girl & Boy Studio) | 7 |
| Figure 3 – 'Discovery in the Dark - Wales' logo (credit: Girl & Boy Studio) | 8 |
| Figure 4 – 'Discovery in the Dark - Wales' imagery example (credit: Girl & Boy Studio) | 9 |
| Figure 5 – 'Discovery in the Dark - Wales' imagery example (credit: Girl & Boy Studio) | 9 |

1 INTRODUCTION

Discovery in the Dark – Wales aims to develop and promote dark skies activities throughout the Welsh National Parks. Although astronomy is one of the oldest sciences, developing stargazing as part of a holiday and visitor experience will bring it to new audiences. This will provide a new spin on the concept of a '24/7 holiday' – unique experiences found in the tranquillity and seclusion of Wales. It also offers a way of extending the visitor season by capitalising on long clear winter nights. This project will develop the Brecon Beacons, Pembrokeshire Coast and Snowdonia National Parks as dark skies destinations for night-time activities including stargazing, and 'dusk-till-dawn' activities such as moonwalks and nocturnal wildlife safaris.

This toolkit is intended to help trades operating within the three Welsh National Parks to capitalise on the dark skies opportunities available to them but also preserve this incredibly important feature of the Parks. It has been developed by *TACP (UK) Ltd* with input from *Gareth Kiddie Associates, Girl & Boy Studio* and *Anturus Media Collective*. It sits alongside a *Branding and Marketing Plan* which explains further the process that has been used to develop these activities and how they sit within the project's future development plans.

The toolkit is hyperlinked throughout to external sources of information and other relevant sections within it. The following symbolise these links:

Links within this document Links to external material

1.1 DARK SKIES

Human impact on the environment is ever increasing with an increase in light pollution from lighting resulting in the night skies no longer being dark; 90% of the UK population cannot see the Milky Way from their homes. In an effort to reduce light pollution, there has been a fast developing dark skies movement with efforts being asserted internationally as well as within the UK and Wales. The advantages of reducing light pollution include increased visibility of stars at night, reduced impacts of unnatural lighting on the environment, and cuts in energy usage and greenhouse gas emissions.

There are many organisations with initiatives related to dark skies:

INTERNATIONAL DARK SKY ASSOCIATION

The International Dark-Sky Association (IDA) (http://darksky.org/idsp/) is the world authority on light pollution and is the leading organization combating light pollution to protect the night skies for present and future generations. Its goals are to:

- Advocate for the protection of the night sky;
- Educate the public and policymakers about night sky conservation;
- Promote environmentally responsible outdoor lighting; and
- Empower the public with the tools and resources to help bring back the night.

INTERNATIONAL DARK SKY RESERVES

International Dark Sky Reserves (designated by the IDA) are public or private land of at least 700 km², accessible to the public in part or whole, that are legally protected for scientific, natural, educational, cultural, heritage and/or public enjoyment purposes. The core area must provide an exceptional dark sky resource, relative to the communities and cities that surround it, where the night sky brightness is routinely equal to or darker than 20 magnitudes per square arc second (http://darksky.org/idsp/become-a-dark-sky-place/). Peripheral areas support dark sky preservation in the core.

Reserves are formed through partnerships of land managers who recognize the value of the natural night-time environment through regulation and long-term planning. The Brecon Beacons and Snowdonia National Parks have International Dark Sky Reserve status.

INTERNATIONAL DARK SKY PARKS

International Dark Sky Parks are similar to Dark Sky Reserves but are smaller areas. Examples in the UK are Elan Valley Estate (Wales), Galloway Forest (Scotland), Northumberland National Park (England) and Kielder Water & Forest Park (England).

UK DARK SKY DISCOVERY PARTNERSHIP

The UK Dark Sky Discovery partnership (http://www.darkskydiscovery.org.uk/) is an NGO network of national and local astronomy and environmental organizations which aims to:

- Engage people from diverse backgrounds with the night sky;
- Encourage positive attitudes towards science and technology;
- Support the development of dark sky places, awareness and tourism;
- Develop a national network of dark sky communicators; and
- Create long-lasting organisational partnerships.

DARK SKY DISCOVERY SITES

Dark Sky Discovery Sites are a nationwide network of places that provide great views of the night sky and which are accessible to everyone. They have been nominated by local groups and organisations and designated by the UK Dark Sky Discovery Partnership. In order to qualify for Dark Sky Discovery Site status, the locations need to meet a number of criteria that make them safe and accessible as well as having suitably dark skies. Dark Sky Discovery Sites are places that:

- Are away from the worst of any local light pollution;
- Provide good sightlines of the sky; and
- Have good public access, including firm ground for wheelchairs and are generally freely accessible at all times.

A map of Dark Sky Discovery Sites can be viewed at: http://www.darkskydiscovery.org.uk/dark-sky-discovery-sites/map.html

Page 2 TACP 8329

COMMISSION FOR DARK SKIES

The Commission for Dark Skies is part of the British Astronomical Association (BAA), a non-government organisation (NGO) with national membership, which is concerned about the rapid increase of light pollution across the UK (http://www.britastro.org/dark-skies/index.php). The Campaign has hundreds of members from a wide range of disciplines. Its aim are:

- Greater use of modern fittings which control the light emitted and warm colour temperature light sources, to minimise sky-glow and light trespass.
- The right amount of light for the task.
- Use of sensible wattages; a 40W equivalent light will adequately illuminate the average driveway and garden.
- Controls on floodlighting of buildings, sports facilities, etc., with appropriate switching, shielding, baffles
 and mounting adaptation, causing lamps to shine where the light is actually needed, and only when
 needed.
- Instructions about sensitive mounting, and information about light intrusion and other possible adverse effects, in the packaging of all exterior lights.

WORKING TOGETHER TO BUILD A DARK SKY NATION

The third parties and businesses mentioned in this manual are used for example and we acknowledge that there are other organisations and individuals out there who may also offer similar or comparable services. We do not endorse any specific provider of any specific service and have developed this manual so that others can build their businesses so that across Wales we can all work together to build a Dark Sky Nation.

1.2 DARK SKIES FOR BUSINESSES

International Dark Skies Reserve status and Darks Skies Discovery Sites provide business opportunities at several levels to attract new and repeat visitors, to extend the tourist season into off-peak periods, and to provide better visitor experiences:

- Direct opportunities through running dark skies events/activities/holiday packages such as guided stargazing evenings, night mountain biking events, bat walks, etc.
- Direct opportunities through sale or hire of dark skies equipment such as telescopes, mobile planetariums, infrared night scopes, bat detectors etc.
- Direct opportunities through marketing dark skies credentials/unique selling points to attract visitors such as high quality dark skies, telescope availability, badgers visiting, sunset/sunrise viewing, etc.
- Indirect opportunities and links through advertising other dark skies events locally as things for visitors to do to enhance motivation to visit the parks and generate business.
- Being part of a wider dark skies branding and advertising campaign with spin-off benefits from events and motivation to visit.
- Cost savings through reducing light output/energy consumption to contribute to overall dark skies of the parks and enhance green tourism credentials which is a proven attraction for key markets.

1.2.1 SUSTAINABLE TOURISM

The *Discovery in the Dark – Wales* project is part of a wider sustainable tourism agenda. Applications of other sustainable tourism initiatives are detailed on the Visit Wales Destination Management website, available at: http://businesswales.gov.wales/dmwales/sustainable-tourism.

1.3 ACTIVITIES AND ADVENTURES DEVELOPMENT PROCESS

The process for developing the suite activities of activities and adventures is outlined in Figure 1. Trade organisations were consulted with by telephone and e-mail; surveys shared with stakeholders and visitors; and specialist knowledge was sought to identify any specific constraints and considerations. All information was compiled and presented at a workshop during which the activities and adventures in development were refined further.



Figure 1 – Process used to develop the suite of activities and adventures

1.3.1 TRADE CONSULTATIONS

Appendix E details the organisations approached and the questions they were asked. The results were incorporated into the suite of activities and adventures and used to help guide the workshop.

1.3.2 STAKEHOLDER SURVEY

During the course of the project, Pembrokeshire Coast National Park Authority issued an online survey to key stakeholders. Unfortunately, the survey received only four responses:

- Clwydian Range and Dee Valley Area of Outstanding Natural Beauty
- Elan Valley International Dark Sky Park
- Isle of Anglesey Area of Outstanding Natural Beauty
- Llŷn Area of Outstanding Natural Beauty

The results were incorporated into the development of the activities and adventures

Page 4 TACP 8329

1.3.3 VISITOR SURVEY

A Microsoft Office Excel Online survey was shared via the National Parks' Twitter accounts in both English and Welsh (see Appendix C for details of the questions asked).

A total of 50 results were received (presented in Appendix D). They indicate a relatively even distribution of visitor across all segments (between 20 and 25 %) with the exception of 'Older cultural explorer couple', which received 10 %. This is possibly due to the method of distributing the survey; between May 2013 and November 2015, users of Twitter over the age of 45 represented an average of just 22 % of all users in Great Britain¹.

The majority of respondents (48 %) take part in nature based activities regularly with two exceptions; 'Other' and 'Pre-family explorers' who take part in these types of activities sometimes. The most compelling response was from the 'Older cultural explorer couple' segment with 80 % of respondents indicating that they regularly take part in nature based activities, with none indicating that they never or sometimes take part in these activities (20 % provided no answer).

The question regarding physical activities received the clearest response of the activity based questions. The majority of respondents (66 %) across all segments regularly take part in physical activities with none indicating that they never take part in these types of activity (34 % answered with sometimes).

60 % of all respondents indicated that they sometimes take part in astronomy based activities. The only segment with a majority indicating that they regularly take part in astronomy based activities was 'Scenic explorer couple' (40 %) whilst the 'Older cultural explorer couple' segments' majority was split across never and sometimes (40 % each).

72 % of all respondents indicated that they sometimes take part in historical/cultural related activities. The only segment with a majority indicating that they regularly take part in historical/cultural related activities was 'Older cultural explorer couple' (80 %); the majority of all other segments indicated that they sometimes take part in these types of activities.

The results show that the majority of visitors, across all segments, engage in activities independently of a tourism provider (76.4 % on average). The younger of the segments, 'Activity family explorer' and 'Pre-family explorer' are more likely to engage in activities via a mix of independently and through a tourism provider (60 % and 67 % respectively) than their older counterparts.

In summary, the visitor survey indicates that the most popular types of activities are physical followed by nature based, historical/cultural related and, finally, astronomy based.

¹ Statista. (2016). Age distribution of Twitter users in Great Britain from May 2013 to November 2015. Retrieved February 19, 2016, from Statista: http://www.statista.com/statistics/278320/age-distribution-of-twitter-users-in-great-britain/

1.3.4 WORKSHOP

A workshop was held in Aberystwyth on January 29th 2016 to develop the activities and adventures with the individuals/organisations detailed in Appendix E in attendance.

The workshop summarised the project, progress with the branding and marketing plan and the activities and adventures developed to date. Those present were split into groups and invited to put their ideas into template spreadsheets provided.

1.4 MARKETING AND BRANDING

1.4.1 MARKETING

As part of the project, a *Branding & Marketing Plan* has been developed. This describes how the National Parks in Wales are working together to develop an exciting new programme of work that harnesses their depth of experience in working on visitor initiatives related to dark skies. The Plan sets out an ambitious vision that is concerned to connect visitors' appreciation of the stars and their participation in 'night-time adventure' type activities, with a desire to take practical actions to protect and enhance our dark skies - for the benefit of wildlife and of future generations. Indeed, the mission going forward is to draw in other key partners and work towards establishing Wales as the world's first 'Dark Sky Nation'.

The National Parks in Wales are well-placed to deliver on this vision and mission. They already have international standing, by virtue of the fact that two of only ten International Dark Sky Reserves in the world are located in National Parks in Wales. Add in to that mix; a treasury of iconic locations, a strong track record of delivering 'dark sky' events & activities, an established infrastructure for sustainable tourism and active support from the tourism trade, and there is much to build upon.

1.4.2 WEBSITE

Under a separate commission, Girl and Boy have developed a website for the project. This website has a section aimed towards trade organisations and will host material and resources they can use to develop dark skies activities and adventures. This toolkit will also be accessible via the project website. Figure 2 shows an example of the website:

Page 6 TACP 8329

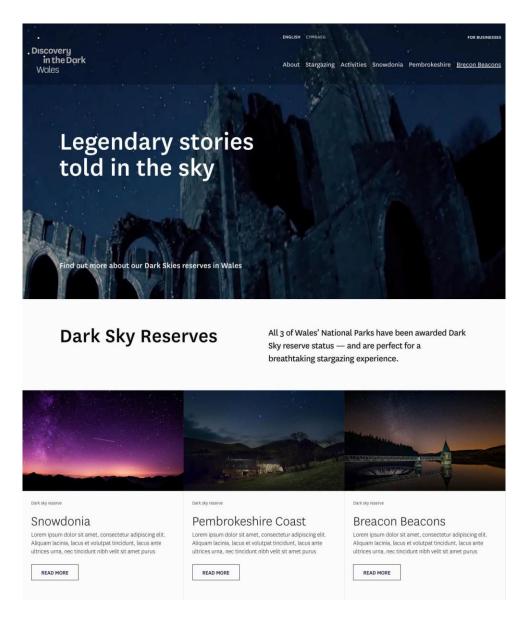


Figure 2 – 'Discovery in the Dark - Wales' website (credit: Girl & Boy Studio)

1.4.3 BRANDING

The main aspects of the branding are as follows:

- A deliberately descriptive name 'Discovery in the dark Wales'.
- A 'look and feel' brand identity rather than a logo and strong 'corporate ID'.
- A brand-mark and colour scheme that matches the lifecycle of stars.
- **Top quality photographic images** of stars / celestial events, and of visitors enjoying night-time adventures in iconic, National Park locations across Wales.
- **Short strapline descriptors** to go with the images and phrased so that they act to turn notions of 'the dark' on its head.

The branding sets out to significantly 'raise the bar' for projects of this nature. The focus is on the use of high quality imagery that target audiences can relate to, combined with a language that is engaging and that challenges preconceptions of being out and about at night.

This branding will be made available via the project's website to trade organisations in order for them to include it on marketing material, where approved by the National Parks.

The following are examples of the branding developed:



Figure 3 – 'Discovery in the Dark - Wales' logo (credit: Girl & Boy Studio)

Page 8 TACP 8329

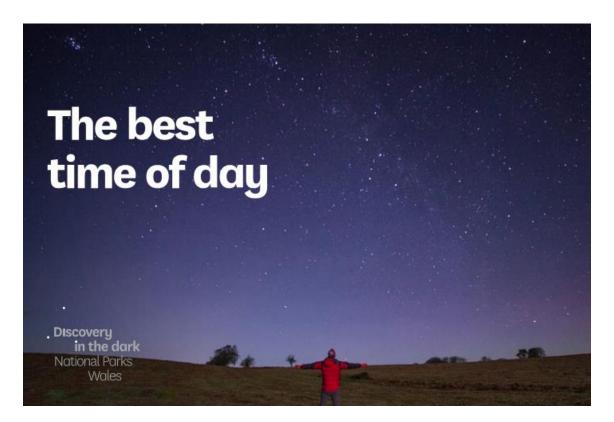


Figure 4 – 'Discovery in the Dark - Wales' imagery example (credit: Girl & Boy Studio)

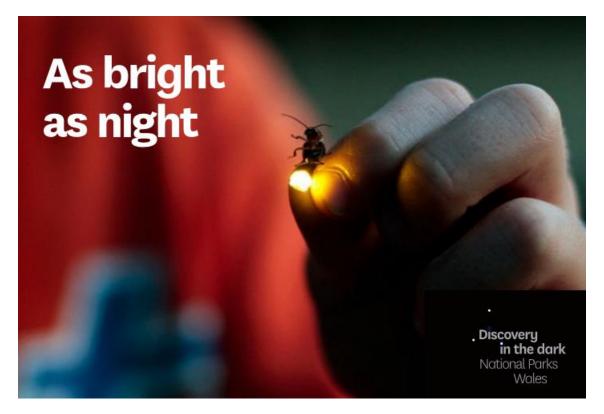


Figure 5 – 'Discovery in the Dark - Wales' imagery example (credit: Girl & Boy Studio)

2 ACTIVITIES AND ADVENTURES

This section details a series of activities and resources which can be used to develop dark skies activities and adventures; their summaries are provided below for quick reference. Some additional ideas for activities and adventures are listed in Appendix A. Table 1 indicates how some of the potential business opportunities discussed in section 1.2 link to Dark Skies activities.

ALL YEAR DARK SKY ASTRONOMY: The amazing dark skies of the National Parks provide wonderful night sky viewing opportunities for stars, planets and moon all year, depending on the weather. These provide business opportunities such as guided star-gazing events or attracting visitors to dark sky properties, or sale/hire of equipment (e.g. telescopes).

PERIODIC DARK SKY ASTRONOMY: A range of celestial events through the year such as shooting star showers and international space station passes space provide opportunities for viewing dark skies events. The main business opportunities will be to organise events related to meteor showers, lunar eclipses and general night sky viewing or use this in marketing material to encourage visitors to come at particular times.

ASTRONOMY SOCIETY EVENTS: Local astronomy societies run events for both their members and for the public, which provide great educational experience and expert guidance. Joint events may provide opportunities to run food provision or guided nature walks, etc.

MOONLIT WALKS/NIGHT WALKING: Moonlit walks and night walks can be popular activities, either organised for groups or self-guided. The main requirements are for safe routes, preferably away from traffic. There may be business opportunities such as guided walks or associated with organised events such as accommodation or food provision, or sale/hire of equipment (e.g. head torches).

NIGHT TRAIL RUNNING: Trail running at night, either for fun or as part of organised competitions, is a challenging activity for visitors seeking activity holidays. Events can be linked to provision of other business opportunities such as food or accommodation, event photography or sale/hire of equipment (e.g. head torches).

NIGHT MOUNTAIN BIKE ADVENTURE: Night-time mountain bike adventures add a challenging dimension to visitors seeking activity holidays. These can be linked to provision of other business opportunities such as food or accommodation, event photography or sale/hire of equipment (e.g. bikes, bike lights).

DARK SKIES CAMPING: Camping, and to some extent caravanning, provide intimate chances to experience the night skies and soundscapes. Campsites with little light pollution can provide an outstanding dark sky experience and can market their dark skies. Other accommodation providers could loan camping equipment for nights out in their grounds. Additional activities such as star gazing, watching shooting stars and badger watching can be linked.

SUNRISE AND SUNSET ADVENTURE: Viewing the sunset and sunrise are activities everyone can enjoy, the main requirement is providing information about locations for the best local viewing points with good access and free from light pollution. These can be linked to provision of other business opportunities such as food, accommodation, photography classes, guided walks, etc. though all are dependent on weather.

Page 10 TACP 8329

NIGHT TRAIN RIDE ADVENTURE: Night train rides have proved to be popular events, and can be linked to provision of other business opportunities such as food, accommodation, photography and astronomy.

NIGHT TIME PHOTOGRAPHY: There are business opportunities to provide night time photography events and courses which can be linked to other opportunities such as food, accommodation, astronomy events and sale or hire of equipment. They can also provide excellent marketing material.

WELSH BEACONS AND BONFIRES: Lighting beacons to form a Welsh network has potential to attract many visitors to enjoy a national, organised event. There would be associated business opportunities such as provision of food, accommodation, story-telling etc.

BAT WALKS: Evening bat walks with interpretation with expert guides are poplar events which can be linked to provision of other business opportunities such as food or accommodation, or sale/hire of equipment (e.g. bat detectors).

GLOW WORM ADVENTURE: Evening walks to look for glow worms, either locally or through interpretation with an expert guide. These can be linked to provision of other business opportunities such as food or accommodation provision.

BADGER WATCHING ADVENTURE: Small, personal guided trips in early evening to watch badgers in setts or at feeding sites at accommodation are very popular, and provide some small business opportunities. As badgers are protected species, trips should be organised by wildlife specialists and knowledge surrounding the location of setts, carefully managed.

NOCTURNAL BIRDS LISTENING ADVENTURE: Nightjars and owls are nocturnal birds which can be heard calling at night in the Welsh National Parks. The calls provide an audio adventure within the night soundscape. There are business opportunities related to provision of guided walks or providing unusual nature attractions.

Table 1 - Potential Business opportunities related to Dark Sky activities. Indirect links are given in brackets.

| Dark Sky Activity and adventures | Events | Sale or hire equipment | Marketing own Dark Sky credentials | Marketing others Dark Sky events | Broader branding benefits | Cost savings |
|----------------------------------|--------|---------------------------|---------------------------------------|-------------------------------------|------------------------------|--------------|
| All year Dark Sky Astronomy | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Periodic Dark Sky Astronomy | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Astronomy Society Events | ✓ | ✓ | ✓ | ✓ | ✓ | |
| Moonlit Walks/Night Walking | ✓ | ✓ | ✓ | ✓ | ✓ | |
| Night Trail Running | ✓ | ✓ | ✓ | ✓ | ✓ | |
| Night Mountain Bike Adventure | ✓ | ✓ | ✓ | ✓ | ✓ | |

| Dark Sky Activity and adventures | Events | Sale or hire equipment | Marketing own Dark Sky credentials | Marketing others Dark Sky events | Broader branding benefits | Cost savings |
|-------------------------------------|--------|---------------------------|---------------------------------------|-------------------------------------|------------------------------|--------------|
| Dark Skies Camping | (✓) | ✓ | ✓ | ✓ | ✓ | ✓ |
| Sunrise and Sunset Adventure | (✓) | | ✓ | ✓ | ✓ | |
| Night Train Ride Adventure | ✓ | | | ✓ | ✓ | |
| Night Time Photography | ✓ | ✓ | ✓ | ✓ | ✓ | |
| Beacons and Bonfires | ✓ | | | ✓ | ✓ | |
| Bat Walks | ✓ | ✓ | ✓ | ✓ | ✓ | |
| Glow Worm Adventure | ✓ | | ✓ | ✓ | ✓ | |
| Badger Watching Adventure | ✓ | ✓ | ✓ | ✓ | ✓ | |
| Nocturnal Birds Listening adventure | ✓ | | ✓ | ✓ | ✓ | |

All activities have been categorised into one of the following four categories:

- 1. Astronomy Activities
- 2. Physical Activities and Adventures
- 3. Cultural/Historical Activities and Adventures
- 4. Nature Activities and Adventures

2.1 SAFETY ADVICE

Night Awareness

Enjoying the outdoors is fun and exciting, however darkness will bring new challenges that you may not have faced in the day. Fortune favours the prepared! So that the adventure can be enjoyed to the full, take time to read the following and consider what planning needs to be done to ensure that the adventure or activity is as safe as it can be. This safety advice applies to all adventures or activities in the dark where participants will be outdoors and exposed to the elements, but take additional care if on cliffs, coast, mountains or hills.

Plan routes carefully before setting off. Note parts of the route that have sudden drops or that are steep or exposed. Choose a route that suits the fitness level of everybody in your group. If on a mountain or hill, reaching the summit is only half the battle so be vigilant as you descend. Tiredness can set in and bring increased risk of slips, trips and falls. If tired take a break, warm up, have something to eat and drink.

Page 12 TACP 8329

Keep to the planned route at all times. If you see others ahead don't be tempted to follow them as they may be taking a much more challenging and dangerous route than you.

Wear comfortable, ankle-supporting walking boots and suitable clothing. Trainers and sandals are not suitable for mountain walking, or for walking on the more rugged sections of footpaths.

Be prepared for unpredictable weather. Take a waterproof and windproof jacket and over trousers. In wintry conditions you'll need to take extra clothing such as a thermal base layer, fleece jacket, gloves and a hat. Even in the summer, take a hat and gloves and clothes that you can put on in layers as it will get cold in the night. Feet can get especially cold so have thick socks. If out on the roads, wear a high visibility jacket. Consider taking a walking pole or two to help you with your balance on uneven or slippery surfaces.

Carry a rucksack that can accommodate plenty of food and drink. It's important to maintain your energy levels, as walking can be hard work and tiredness and fatigue in the dark heightens the risks of getting lost, or having an accident.

Take a map and compass with you and make sure you know how to use them. They are an essential piece of kit. Make sure you pack an extra layer of clothing as temperatures can plummet high up in the peaks and by the coast. It's vital to carry a torch, whistle, first aid kit and mobile phone, but remember — you're not guaranteed a signal in remote places so don't rely on your phone if you get into difficulty.

Check the weather forecast before you set out and if the weather deteriorates, turn back. Conditions at night, especially on mountains can change quickly with fierce winds, low clouds and freezing temperatures making visibility and walking impossible.

Night time weather conditions can change suddenly, and temperatures can plummet especially on those superb star gazing nights when there is little or no cloud cover. Risks caused by cold, wet and slippery surfaces caused by dew, rain or ice will be intensified in the dark, increasing the likelihood of losing your footing, misjudging distances and equipment may be more difficult to operate.

It is in your interest to find out the weather conditions before venturing out. A change in the weather could ruin your plans and could also be very dangerous. The Met Office runs a 24 hour online weather forecast service providing the latest details on ground conditions, visibility, wind speed, wind direction and temperatures throughout the UK. www.metoffice.gov.uk/public/weather/forecast and you can find a specialist mountain forecast here www.metoffice.gov.uk/public/weather/mountain-forecasts/#?tab=mountainHome

Tell someone reliable about your plans, which route you're taking and what time you expect to return-so they can raise the alarm if you don't make it back by your given time. Remember to let them know if your plans change at all.

Check Tide Times

If you are going to have an adventure by the sea on or a river estuary remember to check the tide times. It can be easy to misjudge distances in the dark and tides can come in quick. Information can be found

http://www.bbc.co.uk/weather/coast and sea/tide tables/11/496#tide-details

Emergencies

Fire, Police, Ambulance, Coastguard, Mountain Rescue:

Dial 999 and ask for the appropriate service.

2.2 ACTIVITIES AND ADVENTURE IN PROTECTED PLACES

National Parks include unique and special landscapes, wildlife and historic features; some have special protection and or designation. To check what places have these designations look at the Lle Geo-Portal. Lle Geo-Portal is a useful hub for data and information covering a wide spectrum of topics, and gives details on designated sites for wildlife, landscape and historic interest. The portal will help you plan your activities and adventures so that they are sensitive to their surroundings and do not interfere with wildlife, historic or natural environment.

http://lle.wales.gov.uk/home?lang=en

http://lle.gov.wales/home?lang=cy

2.3 ASTRONOMY ACTIVITIES

2.3.1 ALL YEAR DARK SKY ASTRONOMY

The amazing dark skies above the National Parks provide wonderful night sky viewing opportunities for stars, planets and moons all year, depending on the weather. These provide business opportunities such as guided stargazing events or attracting visitors to dark sky properties, or sale/hire of equipment (e.g. telescopes).

INTRODUCTION

The routine star constellations, moon and planets which are present all year are covered in this section, whilst dark skies events which occur at specific times of year such as meteor showers are dealt with below (Periodic Dark Sky Astronomy). In practice there is a continuum between the two sections but the latter require more detailed planning in advance to take advantage of the opportunities.

The dark skies in the National Parks facilitate seeing the full glory of the universe at night. In winter, the sky achieves full darkness about two hours after sunset, whilst in the short nights of summer it may not get fully dark at all. It can take human eyes up to 30 minutes to fully adjust to starlight. The Brecon Beacons National Park

Page 14 TACP 8329

general introduction to stargazing provides an excellent resource and is also applicable to Pembrokeshire Coast and Snowdonia National Parks: http://www.breconbeacons.org/all_downloads/dark-sky-wales-guide-night-sky.pdf. This resource was produced for the Brecon Beacons National Park Authority by Dark Sky Wales.

There are various business opportunities, including:

- to run star-gazing/night time events (either your own or from others);
- to attract visitors to properties or local facilities where they can appreciate the dark skies for themselves;
- to provide facilities (e.g. telescopes, binoculars, mobile planetariums, interpretative material, guided access to best internet sites);
- educational star-gazing events could be run for schools or children's birthday parties.

Due to the unpredictable nature of the weather, it is advisable to run large guided star-gazing events in combination with other activities such as indoor planetariums, talks and food. Events for small groups/families might be organised on an *ad hoc* basis to take advantage of good weather.

A huge range of websites have information on the night sky, including:

- www.darksky.org/
- www.darkskydiscovery.org.uk
- www.bbc.co.uk/science/space/
- http://astronomy.swin.edu.au/cosmos/
- www.nasa.gov/
- http://fourmilab.ch/earthview/vplanet.html
- http://fourmilab.ch/yoursky
- www.esa.int

STARS AND CONSTELLATIONS

There are many different star charts, constellation maps and planispheres (adjustable star charts) available showing the position of the stars and planets, which are constantly changing as the earth spins around the sun and through space. As what is visible in the night sky varies by location, time of night and time of year, the range of interactive mobile applications available provide a great means of understanding what is visible. A huge range of resources are available, e.g.:

- Websites, including:
 - http://www.stargazing.net/david/constel/skymapindex.html
 - o http://www.sky-map.org/
- Mobile phone applications, including,
 - O Sky map
 - https://play.google.com/store/apps/details?id=com.google.android.stardroid&hl=en GB
 - O Skyview https://itunes.apple.com/gb/app/skyview-free-explore-universe/id413936865?mt=8
 - Star chart
 - https://play.google.com/store/apps/details?id=com.escapistgames.starchart&hl=en_GB
- A range of websites comparing apps, including:

- http://appadvice.com/appguides/show/astronomy-apps
- http://nerdsmagazine.com/best-astronomy-apps-for-android/)
- Printed matter (e.g. books such as 'Star gazing for dummies' by Steve Owens and leaflets, newspapers).
- Television programs such as BBC Stargazing Live and BBC Sky at Night (available through BBC iPlayer).

MOON

The different phases of the moon result in varied dark skies opportunities throughout the regular lunar cycle. Strong moonlight tends to interfere with viewing dimmer stars, but can be a spectacular sight in its own right and provides opportunities for related activities such as moonlit walks. The following website can help to plan in advance for different phases of the moon: http://www.timeanddate.com/astronomy/moon/super-full-moon.html

As the moon's obit varies in distance from the earth, the size of the moon also changes. When it is close to the earth the moon is called a Supermoon and when at distance it is called a Micromoon. The following website identifies when the next Supermoon will be visible: http://www.timeanddate.com/astronomy/moon/super-full-moon.html

For lunar eclipses, see Periodic Dark Sky Astronomy.

PLANETS

The regular movement of the planets gives a varied night sky. Obvious planets to look for are Venus (very bright, especially after dusk and before dawn) and Mars (reddish colour). The moons of Jupiter or rings of Saturn also provide great examples of celestial objects which can be seen with telescopes or binoculars. Mercury is visible but can be very hard to spot.

Many websites provide information on how to locate planets, including: http://www.astroviewer.com/index.php

POTENTIAL MARKETS

Potentially all visitors:

| Group description | Visit Wales category |
|--------------------------------|---------------------------------|
| Young adventurers | Pre-family explorers |
| Active outdoor-loving families | Activity family explorers |
| Couples enjoying scenery | Scenic explorer couples |
| Older adventurous couples | Older cultural explorer couples |

Descriptions of these groups can be found in Appendix B.

KEY LOCATIONS

BRECON BEACONS NATIONAL PARK

Brecon Beacons National Park has International Dark Sky Reserve status and there are many places for seeing stars. Ten places are recommended on the Park's website: http://www.breconbeacons.org/stargazing-ten-places

Page 16 TACP 8329

PEMBROKESHIRE COAST NATIONAL PARK

Pembrokeshire Coast National Park currently has eight Dark Sky Discovery Sites around the coast, which can be located via the interactive Dark Skies Discovery website map: http://www.darkskydiscovery.org.uk/dark-sky-discovery-sites/map.html

SNOWDONIA NATIONAL PARK

The National Park has International Dark Sky Reserve status and there are many places for seeing stars. Five are recommended on the Park's website: http://www.eryri-npa.gov.uk/looking-after/dark-skies/5-places-to-see-the-stars

CASE STUDIES

BRECON BEACONS NATIONAL PARK

Brecon Beacons National Park organise a series of events and lectures with guest speakers at various locations followed by stargazing sessions (weather permitting). More information is available at: http://www.breconbeacons.org/events/7161

BRECON BEACONS OBSERVATORY

Located at the National Park Visitor Centre (Mountain Centre) near Libanus and owned by the Brecon Beacons National Park Authority. The director of the observatory is Martin Griffiths and there are a number of trained operators. Currently this observatory is used largely by larger groups for events. However, there may be opportunities in the future for the trade to benefit from the facilities. For more details contact darkskies@beacons-npa.gov.uk

DARK SKY TELESCOPE HIRE

Dark Sky Telescope Hire have developed a series of activities across Britain including guided talks and telescope hire. There is flexibility built in to account for the weather. Their website provides further information: http://www.darkskytelescopehire.co.uk/exmoor-dark-sky-experience/

SNOWDONIA NATIONAL PARK

Snowdonia National Park offer dark sky astronomy and mythology courses at Plas Tan y Bwlch. Further information is available at: http://www.eryri-npa.gov.uk/study-centre/public-courses/course-details/diddordebau-arbennig/the-night-sky2

STARGAZERS RETREAT

Stargazers Retreat provides accommodation with peace and tranquillity with a computerised Mead telescope for visitors to use in its own observatory. Further information is available at: http://www.stargazersretreat.co.uk/

DARK SKY WALES

Dark Sky Wales is a provider of bespoke astronomy evenings for individuals and groups under the dark skies of Wales. Using astronomical equipment its expert astronomers will guide you around the night sky allowing you to make amazing discoveries. It is also able to provide the trade with assistance in establishing astronomy themed evenings and partner with them to deliver great experiences for their customers. http://darkskywalestrainingservices.co.uk/

EXMOOR NATIONAL PARK

Exmoor National Park has developed a series of business related opportunities to Dark Skies:

- Local accommodation providers use the Dark Sky designation as a marketing tool.
- Exmoor Stargazing Experience Nights—guided talks and viewing (laser-guide and telescope) at venues for one, two or three hours with telescopes.
- Telescope hire from £25 per night.

Further information is available at: http://www.exmoor-nationalpark.gov.uk/ data/assets/pdf file/0004/638500/IDSA-Dark-Sky-Places-Annual-Report-October-2014-2015.pdf

KEY PARTNERS

There are numerous photography courses offered in all national parks (use internet search engines), some of which include night photography.

Other organisations such as the astronomy societies etc. may have events running that it may be possible to prebook customers onto. Details of some of the astronomy societies operating within the National Parks are presented in **Table 3**.

CONSTRAINTS

Strongly dependent on the weather; clear skies are required.

SEASONALITY

This activity is suitable throughout the year.



ACCESS FOR ALL

Generally accessible for all, depending on individual spots to see dark skies at local properties.

SAFETY CONSIDERATIONS

Risk assessments will be required for public events.

SEE also

2.1 SAFETY ADVICE

Page 18 TACP 8329

2.2 ACTIVITIES AND ADVENTURES IN PROTECTED PLACES

EQUIPMENT/FACILITIES REQUIRED

The following equipment/facilities may be required:

- Safe place to view stars away from direct light sources e.g. dark corner of garden, grounds of hotel, grounds of castle or churchyards with clear access.
- Looking up at the sky continuously can be hard on the neck and chilly, so provision of chairs or loungers
 and blankets (hot water bottles or even electric blankets) for star gazing will help the enjoyment. Some
 businesses even offer star watching from hot tubs.
- It is not essential to have telescopes and binoculars but they can help to show the sheer depth of space, and see moons and rings around planets.
- Telescopes and binoculars could be made available free or for hire.
- Guides to the night sky (e.g. star charts, planispheres, phone apps may work quicker with local Wi-Fi which could be made available to guests, if in range of routers)
- Torches
- Optional snacks and hot drinks etc.

RELATED ACTIVITIES

Astronomy activities: Periodic Dark Sky Astronomy, Astronomy Society events

Cultural/historical activities and adventures: Sunrise and Sunset Adventure, Night Train Ride Adventure, Night Photography

ADDITIONAL INFORMATION

The National Parks' websites and social media channels list/promote events including those related to dark skies.

Star-gazing phone apps which require internet may work quicker with local Wi-Fi which could be made available to guests, if in range of routers.

2.3.2 PERIODIC DARK SKY ASTRONOMY

A range of celestial events through the year such as shooting star showers and international space station passes space provide opportunities for viewing dark skies events. The main business opportunities will be to organise events related to meteor showers, lunar eclipses and general night sky viewing or use this in marketing material to encourage visitors to come at particular times (All Year Dark Sky Astronomy).

INTRODUCTION

In addition to the stars, moon and planets which are visible all year, there are a multitude of periodic celestial events which can be seen in dark skies and provide interest or offer potential for guided activities at particular

times of year. The key to these is knowledge of the timing and thus being able to guide visitors to maximize opportunities to see them.

There are many websites and apps which offer free star calendars and information, including:

- http://www.skyandtelescope.com/observing/sky-at-a-glance/
- http://www.seasky.org/astronomy/astronomy-calendar-2016.html
- http://pocketuniverse.info/
- https://play.google.com/store/apps/details?id=com.google.android.stardroid

The following are examples of the key periodic dark sky events:

SHOOTING STARS/METEORS

Shooting stars are created when meteors burn up in the earth's atmosphere. A meteorite is a meteor which has reached the ground rather than being burnt up (small meteorites are even available to buy on the internet for a few hundred pounds). Shooting stars are best seen when there is no moon.

Shooting stars can occur at any time of year but there are a series of regular 'meteor showers' during which there are many meteors and they are more likely to be spotted (see

Table 2). The best-known meteor showers are the Perseids in August, the Orionids in October, and the Geminids in December. At peak times and in optimum conditions, tens to hundreds can be seen each hour.

There are many websites and apps which provide information on meteor showers, including:

- Time and date website: http://www.timeanddate.com/astronomy/meteor-shower/
- Meteor Shower Calendar: https://itunes.apple.com/us/app/meteor-shower-calendar-free/id579332001?mt=8

Table 2 – Meteor shower peak dates

| Meteor shower | Approximate peak |
|---------------|------------------------|
| Quadrantids | December 27-January 12 |
| Lyrids | April 16-26 |
| Eta Aquarids | May 5-6 |
| Perseids | August 11-13 |
| Draconids | October 7-8 |
| Orionids | October 21-22 |
| Geminids | December 13-14 |
| Ursids | December 22-23 |

COMETS

Page 20 TACP 8329

Comets are small (tens of metres to several kilometres across) solar system bodies made mostly of ices (e.g. water, methane, ammonia and carbon dioxide) with some dust and rock. The comet gives out gas and dust which, when heated by the sun, gives rise to their characteristic dust and plasma trails. Some have asymmetric, elliptical orbits and appear at specific times over long periods, others pass by once.

Some comets can be seen with the naked eye (great comets, about once every 10 years), but most require telescopes. There is usually at least one comet visible each year.

Details of when they are visible can be found at: http://cometchasing.skyhound.com/

LUNAR ECLIPSES

On average, a total lunar eclipse can be seen approximately every 2.5 years. The refraction of sunlight around the earth (same effect as sunrise and sunset) can result in the moon appearing 'red' (blood moon) during the eclipse.

Time and date website gives predictions of next total lunar eclipses: http://www.timeanddate.com/eclipse/total-lunar-eclipse.html

INTERNATIONAL SPACE STATION AND SATELLITE PASSES

Passes of the International Space Station (ISS) overhead are a spectacular sight at night or dusk, providing a very bright, fast moving object which take about one minute to cross the sky (it looks like a plane but is much higher, faster and brighter, clearly visible to the naked eye). Its predictability means they can be watched for with precision timing.

- The NASA website gives sighting opportunities: http://spotthestation.nasa.gov/sightings/
- Mobile phone applications providing alerts to ISS passes include:
 - http://www.issdetector.com/
 - o https://itunes.apple.com/gb/app/iss-spotter/id523486350?mt=8.

Satellites also pass over regularly but are harder to see.

NORTHERN LIGHTS/AURORA BOREALIS

The northern lights/aurora borealis can be seen from all parts of Wales, though more likely in Snowdonia and in the winter. The darker the skies, the better the chances of seeing this phenomenon. Solar activity (thus also the aurora) varies on an approximate 11-year cycle with 2013 being a recent peak.

Attracting visitors for the northern lights may require specialist, reactive, short-term marketing. As the northern lights are unpredictable in occurrence, the best way to find out about them is to sign up for forecasts (1-3 days) or alerts (1 hour).

- Aurora Watch UK website (and Facebook page): http://aurorawatch.lancs.ac.uk/alerts#apps
- Aurora Service Europe http://www.aurora-service.eu/aurora-forecast/

POTENTIAL MARKETS

As above, for All Year Dark Sky Astronomy.

KEY LOCATIONS

As above, for All Year Dark Sky Astronomy.

CASE STUDIES

As above, for All Year Dark Sky Astronomy.

KEY PARTNERS

As above, for All Year Dark Sky Astronomy.

CONSTRAINTS

As above, for All Year Dark Sky Astronomy.

SEASONALITY

As above, for All Year Dark Sky Astronomy.

ACCESS FOR ALL

As above, for All Year Dark Sky Astronomy.

SAFETY CONSIDERATIONS

As above, for All Year Dark Sky Astronomy.

EQUIPMENT/FACILITIES REQUIRED

As above, for All Year Dark Sky Astronomy.

RELATED ACTIVITIES

Astronomy activities: All Year Dark Sky Astronomy, Astronomy Society Events

Cultural/historical activities and adventures: Sunrise and Sunset Adventure, Night Train Ride Adventure, Night Photography.

Nature activities and adventures: Glow Worm Adventure, Badger Watching Adventure.

Page 22 TACP 8329

2.3.3 ASTRONOMY SOCIETY EVENTS

Local astronomy societies run events for both their members and for the public, which provide great educational experience and expert guidance. Joint events may provide opportunities for food provision or guided nature walks, etc.

INTRODUCTION

Local astronomy societies run events for both their members and for the public. Many societies have monthly meetings through the year with lectures and workshops, and may have libraries, videos and various telescopes and imaging equipment for use and loan to members. They can provide an excellent place to learn about the night skies for both providers and visitors, and some may be valuable partners in joint events.

Small fees are usually charged for membership or for events. It is advisable to confirm that events are happening, and if visitors are welcome and the costs in advance.

Astronomy societies are usually run on a voluntary basis, but may be a source of local experts to run commercial events or provide astronomy-related material for businesses.

POTENTIAL MARKETS

Potentially all visitors:

| Group description | Visit Wales category |
|--------------------------------|---------------------------------|
| Young adventurers | Pre-family explorers |
| Active outdoor-loving families | Activity family explorers |
| Couples enjoying scenery | Scenic explorer couples |
| Older adventurous couples | Older cultural explorer couples |

Descriptions of these groups can be found in Appendix B.

KEY LOCATIONS

See **Key Partners** below for websites and locations of current events.

CASE STUDIES

See **Key Partners** below for websites and locations of current events.

KEY PARTNERS

The following astronomy societies operate within the three National Parks:

Table 3 – Astronomy Societies operating within or nearby to the Welsh National Parks

| Society | National Park | Website |
|----------------------------------|------------------------------|------------------------------|
| Abergavenny Astronomy Society | Brecon Beacons National Park | http://abergavennyas.org.uk/ |

| Society | National Park | Website |
|--|---------------------------------------|--|
| Cardiff Astronomical Society | Brecon Beacons National Park (nearby) | http://www.cardiff-astronomical-society.co.uk/ |
| Heads of the Valleys Astronomical Society | Brecon Beacons National Park | http://www.hovastronomy.org.uk/ |
| Usk Astronomy Society | Brecon Beacons National Park | http://www.uskastronomicalsociety.org.uk/ |
| Preseli Astronomy Society | Pembrokeshire Coast National Park | http://www.pasgroup.org.uk/ |
| Gwynedd Astronomy Society | Snowdonia National Park | http://www.gwyneddastronomysociety.co.uk/ |
| North Wales Astronomy Society | Snowdonia National Park | http://northwalesastro.co.uk/ |

CONSTRAINTS

Indoor lectures are independent of weather, but outdoor viewing events are not.

Local astronomy societies will have their own programmes and agendas which need to be considered when planning events.

SEASONALITY

This activity is suitable throughout the year.

| JAN FEB MAR APR MAY JUN JUL AUG SEP OCT N | V DEC |
|---|-------|
|---|-------|

ACCESS FOR ALL

Generally accessible for all, depending on location of events.

SAFETY CONSIDERATIONS

Indoor events are usually held in safe locations. Outdoor events can be held in a range of different locations and may require risk assessments.

SEE also

- 2.1 SAFETY ADVICE
- 2.2 ACTIVITIES AND ADVENTURES IN PROTECTED PLACES

Page 24 TACP 8329

EQUIPMENT/FACILITIES REQUIRED

As above, for All Year Dark Sky Astronomy.

The societies often have telescopes and other equipment which can be used by members. They may be willing to hire it out for short periods for events.

RELATED ACTIVITIES

Astronomy activities: All Year Dark Sky Astronomy, Periodic Dark Sky Astronomy.

Physical activities: Moonlit Walks/Night Walking.

Cultural/historical activities and adventures: Night Photography.

2.4 PHYSICAL ACTIVITIES AND ADVENTURES

2.4.1 MOONLIT WALKS/NIGHT WALKING

Moonlit walks and night walks can be popular activities, either organised for groups or self-guided. The main requirements are for safe routes, preferably away from traffic. There may be business opportunities such as guided walks or associated with organised events such as accommodation or food provision, event photography, or sale/hire of equipment (e.g. head torches).

INTRODUCTION

Walking at night with torches or by moonlight can provide a very different appreciation of the night sky and soundscape to that usually experienced under urban street lights. Safe local walking routes of various lengths can be recommended for dark skies night walking experiences.

There may be business opportunities such as guided walks (your own or for other people) or associated with organised events such as accommodation or food provision, or sale/hire of equipment (e.g. head torches).

Safe walking routes with good paths with minimal wet areas, trip hazards, cliff edges etc. will be required. In general, it is probably safest to walk off roads at night (as few motorists expect walkers at night), though some road walking may be required to get access to paths. Some small remote no-through-roads down to the coast or to remote valleys may have minimal traffic at night and be relatively safe. Walking routes could be linked to local pubs or hotels where refreshments could be available.

Walks could also be organised as alternative exercise for members of groups or families not wishing to undertake trail running or mountain biking at night, or linked to other activities such as sunset/sunrise watching, bat walks, photography etc.

Charity events such as Moon Walks raising money for Breast Cancer (http://www.walkthewalk.org/Challenges/TheMoonWalkLondon) are mostly currently held in cities; alternative provision in the National parks could make for a very different experience. Permissions for such events can be obtained from the National Park Authorities.

POTENTIAL MARKETS

Potentially all visitors, though particularly suitable for:

| Group description | Visit Wales category |
|--------------------------------|---------------------------|
| Young adventurers | Pre-family explorers |
| Active outdoor-loving families | Activity family explorers |

Descriptions of these groups can be found in Appendix B.

KEY LOCATIONS

There are many suitable locations with 24-hour public access on tracks, paths and open access land away from traffic throughout the National Parks.

CASE STUDIES

BRECON BEACONS NATIONAL PARK

Blue Moon Charity Walk, Brecon Beacons offer a charity walk (£15 entry fee) up Pen-y-fan to watch the sunset and the moonrise. The walk starts in the evening on a route marked and manned by the Brecon Mountain Rescue Team, with singing, refreshments and a certificate. Further information is available at: http://www.breconbeacons.org/events/5967

PEMBROKESHIRE COAST NATIONAL PARK

The Pembrokeshire cliffs night walk is an 8.5 mile, 4-hour circular route from St David's Visitor Centre. Further information is available at: http://www.theguardian.com/lifeandstyle/2009/oct/31/pembrokeshire-cliffs-night-walk

SNOWDONIA NATIONAL PARK

A guided moonlit walk is offered up Snowdon. Further information is available at: http://www.snowdon-walks.co.uk/snowdon-moonlight-walk-2/

KEY PARTNERS

Other organisations such as outdoor centres and charities may have night walking events that visitors can be prebooked onto.

CONSTRAINTS

No weather constraints but dependent on individual walkers as to their preferences; could be enhanced risks in wet or icy conditions.

It is important to consider that navigation and negotiating rocky paths in the dark is more challenging than during the day.

Page 26 TACP 8329

SEASONALITY

This activity is suitable throughout the year.



ACCESS FOR ALL

Generally accessible for some with disabilities; wheelchair access may depend locally on the quality of paths and tracks.

SAFETY CONSIDERATIONS

The following safety considerations exist:

- It is advisable to have proper clothing, sturdy footwear/boots as the ground may be uneven, mobile phone, map and compass, warm and wet-weather clothing and refreshments.
- During clear nights in the winter, icy paths and tracks may be an additional safety risk.
- It may be advisable to check local mobile phone coverage of routes in advance, in case of accidents.
- Risk assessments will be required for public events, and mechanism for checking all participants are offsite safely at the end of the event.
- Anyone walking onto beaches at night should be aware of the tide times.
- It may be advisable to let someone know where you intend walking and if/where the car will be left to minimise risk of emergency services being called out to look for apparently missing people.

SEE also

- 2.1 SAFETY ADVICE
- 2.2 ACTIVITIES AND ADVENTURES IN PROTECTED PLACES

EQUIPMENT/FACILITIES REQUIRED

The following equipment/facilities may be required:

- Provision of route maps, torches or preferably head torches and spare batteries, reflective vests, compass, whistle, could all improve safety (could be provided as a returnable, small set with first aid kit).
- Some marking of route using reflective night-visible markers could help.
- Possible option of offering additional food on return at local facilities.

RELATED ACTIVITIES

Astronomy activities: All Year Dark Sky Astronomy, Periodic Dark Sky Astronomy

Physical activities: Night Trail Running, Night Mountain Bike Adventure.

Cultural/historical activities and adventures: Sunrise and Sunset Adventure, Night Train Ride Adventure, Night Photography.

Nature activities and adventures: Bat Walks; Glow Worm Adventure, Badger Watching Adventure, Nocturnal Birds Listening Adventure.

ADDITIONAL INFORMATION

Future National Park walking trail leaflets could indicate routes suitable for nights and way-markers could be developed to 'glow-in-the-dark' or be reflective.

2.4.2 NIGHT TRAIL RUNNING

Trail running at night, either for fun or as part of organised competitions, is a challenging activity for visitors seeking activity holidays. Events can be linked to provision of other business opportunities such as food or accommodation, event photography, or sale/hire of equipment (e.g. head torches).

INTRODUCTION

Trail running is a popular activity. There are many companies facilitating trail running with guides or on specific routes in the National Parks. Trail running at night provides a different dimension and challenge to running during the day, and large social events are proving increasingly popular.

Safe running routes with good paths/tracks with minimal wet areas, trip hazards, etc. and preferably off-road should be selected.

Night walks and/or nature activities could also be organised as alternative exercise for members of groups or families not wishing to undertake trail running or mountain biking at night

POTENTIAL MARKETS

Potentially all visitors, though particularly suitable for:

| Group description | Visit Wales category |
|--------------------------------|---------------------------|
| Young adventurers | Pre-family explorers |
| Active outdoor-loving families | Activity family explorers |

Descriptions of these groups can be found in Appendix B.

KEY LOCATIONS

There are many suitable locations with 24-hour public access on tracks, paths and open access land away from traffic throughout the National Parks. There are a few places which has organised runs, for example Coed y Brenin Forest Park (see Case Studies below).

CASE STUDIES

The National Trust host a series of night runs at their properties around Britain. The night runs are about having fun, being social and exploring the outdoors. There is a choice of Explorer routes (1-2 km) or Adventurer routes (6-9 km), mostly on traffic-free paths and trails. Further information is available at: http://www.nationaltrust.org.uk/features/join-us-for-a-night-run

Wild Night run organise a series of night running events around the country, for which entry fees are charged. Further information is available at: http://www.wildnightrun.co.uk/

Page 28 TACP 8329

Petzl Night Trail Wales are autumn night running events at Coed y Brenin Forest Park in Snowdonia. The route is 3-4 km long, not too technical, with enough elevation to challenge the runners; the winner is the one who completes the most laps in 3 hours. It starts at dusk and ends in full darkness. There are associated activities such as a disco, bar, hot food and a race arena lit up with flood lights. Further information is available at: http://www.runcoedybrenin.com/events-at-coed-y-brenin/night-trail/

KEY PARTNERS

Other organisations such as outdoor centres and charities may run events that visitors can be pre-booked onto.

CONSTRAINTS

No weather constraints but dependent on individual runners as to their preference; could be enhanced risks in wet or icy conditions.

SEASONALITY

This activity is suitable throughout the year.



ACCESS FOR ALL

Generally accessible for those with disabilities, may depend locally on the quality of access paths and tracks.

SAFETY CONSIDERATIONS

The following safety considerations exist:

- During clear nights in the winter, icy paths and tracks may be an additional safety risk.
- It may be advisable to check local mobile phone coverage of routes in advance, in case of accidents.
- Risk assessments will be required for public events, and a mechanism for checking all participants are offsite safely at the end of the event.

EQUIPMENT/FACILITIES REQUIRED

The following equipment/facilities may be required:

- Provision of route maps, torches or preferably head torches (some runner prefer one, some the other, some both) and spare batteries, reflective clothing/glo-sticks/lights, compass, whistle, could all improve safety (could be provided as a small, returnable set with first aid kit).
- Some way-marking of route using reflective night-visible markers could help.
- Possible option of offering additional food on return at local facilities.

RELATED ACTIVITIES

Astronomy activities: All Year Dark Sky Astronomy, Periodic Dark Sky Astronomy

Physical activities: Moonlit Walks/Night Walking, Night Mountain Bike Adventure.

Cultural/historical activities and adventures: Sunrise and Sunset Adventure, Night Train Ride Adventure, Night Photography.

Nature activities and adventures: Bat Walks; Glow Worm Adventure, Badger Watching Adventure, Nocturnal Birds Listening Adventure.

ADDITIONAL INFORMATION

There are numerous tips for trail running at night on the internet — a good example is: http://relentlessforwardcommotion.com/2013/11/tips-for-trail-running-at-night/

2.4.3 NIGHT MOUNTAIN BIKE ADVENTURE

Night-time mountain bike adventures add a challenging dimension to visitors seeking activity holidays. These can be linked to provision of other business opportunities such as food or accommodation, event photography, or sale/hire of equipment (e.g. bikes, bike lights).

INTRODUCTION

Mountain biking is a popular visitor activity but is usually carried out during the day. An extra dimension can be added by biking at night, when the thrill-seeking experience is enhanced by running trails in the dark guided by heads torches and bike lights. Decent bike lighting is key to both enjoyment and safety.

To engage wider audiences whilst some family members are mountain biking, other activities could be offered at the same time including astronomy, bat walks and moonlight walks.

Some events could be run as charity events; permissions for such events can be obtained from the National Park Authorities.

Further information is available from Mountain Biking Wales at: http://mbwales.com/Default.aspx

POTENTIAL MARKETS

Potentially all visitors, though particularly suitable for:

| Group description | Visit Wales category |
|--------------------------------|---------------------------|
| Young adventurers | Pre-family explorers |
| Active outdoor-loving families | Activity family explorers |

Descriptions of these groups can be found in **Appendix B**.

KEY LOCATIONS

BRECON BEACONS NATIONAL PARK AND SURROUNDING AREAS

- National-Park-wide:
- Brechfa (nearby): http://www.mbwales.com/en/content/cms/Bases/Brechfa/Brechfa.aspx

http://www.mbwales.com/en/content/cms/Bases/Brecon Beacons/Brecon Beacons.aspx

- The Gap
- Bike Park Wales (nearby):
 http://www.mbwales.com/en/content/cms/Centres/Bike Park Wales/Bike Park Wales.aspx

Page 30 TACP 8329

- Afan Forest Park (nearby):
 http://www.mbwales.com/en/content/cms/Centres/Afan Forest Park/Afan
 Forest Park/Afan
 Forest Park/Afan
- Cwmcarn (nearby): http://www.mbwales.com/en/content/cms/Centres/Cwmcarn/Cwmcarn.aspx
- Coed Trallwm & Elan Valley (nearby):
 http://www.mbwales.com/en/content/cms/Centres/ Coed Trallwm/ Coed Trallwm.aspx

PEMBROKESHIRE COAST NATIONAL PARK AND SURROUNDING AREAS

- Preseli Hills & Rosebush Quarry
- Brechfa (nearby): http://www.mbwales.com/en/content/cms/Bases/Brechfa/Brechfa.aspx

SNOWDONIA NATIONAL PARK AND SURROUNDING AREAS

- Coed y Brenin: http://www.mbwales.com/en/content/cms/Centres/Coed y Brenin/Coed y Brenin.aspx
- Machynlleth: http://www.mbwales.com/en/content/cms/Bases/Machynlleth/Machynlleth.aspx
- Betws-y-Coed: <a href="http://www.mbwales.com/en/content/cms/Bases/Betws-y-Coed/Bet
- Coed Llandegla (nearby):
 http://www.mbwales.com/en/content/cms/Centres/Coed Llandegla/Coed Llandegla.aspx
- Nant yr Arian (nearby):
 http://www.mbwales.com/en/content/cms/Centres/Nant yr Arian/Nant yr Arian.aspx
- Antur Stiniog: http://www.mbwales.com/en/content/cms/Centres/Antur-Stiniog/Antur-Stiniog.aspx
- Clwyds: http://www.mbwales.com/en/content/cms/Bases/Clwyds/Clwyds.aspx

CASE STUDIES

Scott MTB-marathon series include an 'Exposure Lights Big Night Out' run with 40 km and 20 km route options, with an event at Ruthin in 2016. There is an entry fee and lights can be hired.

https://www.mtb-marathon.co.uk/events/september-10th-11th-2016-ruthin-north-wales.html

KEY PARTNERS

Other organisations such as outdoor centres/trail centres and charities may run events that visitors can be prebooked onto.

Cycle hire shops and outdoor activity centres occur in all National Parks.

CONSTRAINTS

No weather constraints but dependent on individual riders as to their preference; could be enhanced risks in wet or icy conditions.

SEASONALITY

This activity is suitable throughout the year, though some trail centres are not open all year (check locally).



ACCESS FOR ALL

Limited suitability for those with disabilities, though may be possible on some purpose-adapted routes.

SAFETY CONSIDERATIONS

The following safety considerations exist:

- Risk assessments will be required for public events, and mechanism for checking all participants are offsite safely at the end of the event.
- During clear nights in the winter, icy paths and tracks may be an additional safety risk.
- It may be advisable to check local mobile phone coverage of routes in advance, in case of accidents.

SEE also

- 2.1 SAFETY ADVICE
- 2.2 ACTIVITIES AND ADVENTURES IN PROTECTED PLACES

EQUIPMENT/FACILITIES REQUIRED

In addition to the normal mountain bike centre facilities such as safe parking, toilets and refreshment facilities, routes should be marked with night-time reflective markers.

Possible option of offering additional food on return at local facilities.

RELATED ACTIVITIES

Physical activities: Moonlit Walks/Night Walking, Night Trail Running.

ADDITIONAL INFORMATION

CTC, the national cycling charity has some night riding tips and tricks:

http://www.ctc.org.uk/news/night-riding-skills-tips-and-tricks-for-mtb-riders-and-leaders

Page 32 TACP 8329

2.5 CULTURAL/HISTORICAL ACTIVITIES AND ADVENTURES

2.5.1 DARK SKIES CAMPING

Camping, and to some extent caravanning, provide intimate chances to experience the night skies and soundscapes. Campsites with little light pollution can provide an outstanding dark sky experience and can market their dark skies. Other accommodation providers could loan camping equipment for nights out in their grounds. Additional activities such as star gazing, watching shooting stars and badger watching can be linked.

INTRODUCTION

Camping, and to some extent caravanning, provides direct, intimate opportunities to experience the night skies and soundscapes. Lighting around campsites varies enormously, ranging from large sites with permanent lights on all night and electric hook-ups resulting in a lot of light pollution, to small campsites with no electric hook-up proving outstanding views of the night sky in dark corners. Camping and caravan sites can improve their light pollution regimes by turning off campsite lights after a certain time (e.g. 11 pm) and using appropriate full cut-off lanterns.

Other accommodation providers such as guest houses could provide tents etc. for one-off nights out under the stars in their grounds for families.

Campsites can may also offer viewing opportunities for bats, badgers and other night time creatures.

Wild camping away from recognised campsites requires permission of the land owner but is generally discouraged for hygiene/disposal of waste reasons. Snowdonia National Park recognises that it happens and has a code of practice including asking the landowner's consent and cleaning up afterwards to minimise impacts. There are some remote mountain bothies (e.g. on Cadair Idris) which also provide opportunities for Dark Skies adventures.

POTENTIAL MARKETS

Potentially all visitors:

| Group description | Visit Wales category |
|--------------------------------|---------------------------------|
| Young adventurers | Pre-family explorers |
| Active outdoor-loving families | Activity family explorers |
| Couples enjoying scenery | Scenic explorer couples |
| Older adventurous couples | Older cultural explorer couples |

Descriptions of these groups can be found in Appendix B.

KEY LOCATIONS

There are numerous camping and caravan sites in the National Parks.

CASE STUDIES

Ynysfaen Campsite, Sennybridge, Brecon Beacons National Park is a small family run campsite with a philosophy of peace and tranquillity. There is camping only and no electric hook-up. They advertise the Dark Sky status of the Brecon Beacons (Jane, the owner is a Dark Skies Ambassador) and chances of seeing badgers, otters and bats - http://www.campingatynysfaen.co.uk/

Trellyn Woodland Camping Pembrokeshire Coast National Park advertise their dark skies and have star charts available - http://www.trellyn.co.uk/Star%20gazing%20Pembrokeshire/

Stargazing Holidays offer dark sky holiday cottages, hotels, camp sites and guesthouses in and around the Dark Sky Reserves and Discovery Sites in the UK and Ireland, including the Brecon Beacons - http://www.stargazing.holiday/

KEY PARTNERS

Local camping and caravanning sites.

CONSTRAINTS

Requires clear or partially/broken cloudy skies for full enjoyment of the dark skies, but the camping may be fun anyway.

SEASONALITY

This activity is suitable throughout the year, though some campsites are closed during the winter (check locally).

ACCESS FOR ALL

Generally accessible for those with disabilities, may depend locally on the quality of access paths and tracks.

SAFETY CONSIDERATIONS

Standard risk assessments for camping and caravan sites will apply. There is a risk of tripping over guy ropes in the dark. Safety of visitors may be a concern, so dark skies campsites with no lighting may need to ensure torches are available.

SEE also

- 2.1 SAFETY ADVICE
- 2.2 ACTIVITIES AND ADVENTURES IN PROTECTED PLACES

EQUIPMENT/FACILITIES REQUIRED

Dark areas in camping and caravan sites.

Page 34 TACP 8329

RELATED ACTIVITIES

Astronomy activities: All Year Dark Sky Astronomy, Periodic Dark Sky Astronomy, Astronomy Society Events

Physical activities: Moonlit Walks/Night Walking, Night Trail Running, Night Mountain Bike Adventure.

Cultural/historical activities and adventures: Sunrise and Sunset Adventure, Night Train Ride Adventure, Night Photography, Welsh Beacons and Bonfires.

Nature activities and adventures: Bat Walks; Glow Worm Adventure, Badger Watching Adventure, Nocturnal Birds Listening Adventure.

2.5.2 SUNRISE AND SUNSET ADVENTURE

Viewing the sunset and sunrise are activities everyone can enjoy, the main requirement is providing information about locations for the best local viewing points with good access and free from light pollution.

These can be linked to provision of other business opportunities such as food, accommodation, photography classes, guided walks, dawn chorus etc., though all are dependent on weather.

INTRODUCTION

Sunsets and sunrises in the glorious natural settings of the national parks are very popular activities during holidays, if somewhat dependent on weather. Visitors can be guided to the best local sites for viewing sunsets and sunrises with details of safe access, perhaps with examples of pictures of what they might expect.

Viewing sunrises may be facilitated by provision of early breakfasts or even a small picnic with a camping stove and/or hot water flask. The dawn chorus may augment the experience.

Competitions can be held for the best sunrise and sunset pictures in different national parks and for different age groups (see also Night Photography below).

POTENTIAL MARKETS

Potentially all visitors:

| Group description | Visit Wales category |
|--------------------------------|---------------------------------|
| Young adventurers | Pre-family explorers |
| Active outdoor-loving families | Activity family explorers |
| Couples enjoying scenery | Scenic explorer couples |
| Older adventurous couples | Older cultural explorer couples |

Descriptions of these groups can be found in **Appendix B**.

KEY LOCATIONS

There are many suitable locations throughout all the National Parks.

CASE STUDIES

PEMBROKESHIRE COAST NATIONAL PARK:

- Where to find the best sunsets in Pembrokeshire: http://www.powells.co.uk/news/where-to-find-the-best-sunsets-in-pembrokeshire
- National Trust include Marloes Sands, Pembrokeshire Coast National Park:
 http://www.walesonline.co.uk/news/wales-news/cliff-top-walk-wales-been-10076271

SNOWDONIA NATIONAL PARK

Guided Snowdon moonlit walk to see sunset and full moon: http://www.snowdon-walks.co.uk/snowdon-moonlight-walk-2/

BRECON BEACONS NATIONAL PARK:

 Top 5 locations for Brecon Beacons Landscape Photography: http://www.landscapesuncovered.com/brecon-beacons-photography/

KEY PARTNERS

Guided walks are usually run through local activity centres and often combine sunset and night walks. Other organisations such as the National Park Authorities or National Trust, may run events that visitors can be pre-booked onto.

Local suppliers may be found using internet search engines and include:

SNOWDONIA NATIONAL PARK

- http://www.snowdon-walks.co.uk
- http://www.snowdonia-adventures.co.uk/adventure days/snowdon.html

BRECON BEACONS NATIONAL PARK

http://www.hawkadventures.co.uk/activities_evenightwalks.html

PEMBROKESHIRE COAST NATIONAL PARK

http://www.walkingpembrokeshire.co.uk/content.asp

CONSTRAINTS

Requires clear or partially cloudy/broken could skies.

SEASONALITY

This activity is suitable throughout the year.



Page 36 TACP 8329

ACCESS FOR ALL

Generally accessible for those with disabilities, may depend locally on the quality of access paths and tracks.

Suitable for all depending on access to key viewpoints, with some specially adapted routes e.g.:

- Brecon Beacons National Park:
 http://www.breconbeacons.org/explore/easier_access/easier_access-walks
- Pembrokeshire Coast National Park: http://www.pembrokeshirecoast.org.uk/?PID=379

SAFETY CONSIDERATIONS

Risk assessments will be required for public events.

SEE also

- 2.1 SAFETY ADVICE
- 2.2 ACTIVITIES AND ADVENTURES IN PROTECTED PLACES

EQUIPMENT/FACILITIES REQUIRED

Safe place to view sunsets or sunrises, preferably with safe car parking, toilet and refreshment facilities

Torches for access in the dark to or from viewing sites.

Possible option of offering picnic for morning breakfast with camping stove or hot water flask.

RELATED ACTIVITIES

Astronomy activities: All Year Dark Sky Astronomy, Periodic Dark Sky Astronomy

Physical activities: Moonlit Walks/Night Walking.

Cultural/historical activities and adventures: Dark Skies Camping, Night Photography, Welsh Beacons and Bonfires.

Nature activities and adventures: Bat Walks; Glow Worm Adventure, Badger Watching Adventure, Nocturnal Birds Listening Adventure.

ADDITIONAL INFORMATION

Competitions for best amateur photographs for different age categories, different types of view (castle, sea, standing stones) etc. could be run, organised through the project's website or National Parks and publicised via trade and public allowed to vote for their favourite and to rank best locations (e.g. TripAdvisor style).

2.5.3 NIGHT TRAIN RIDE ADVENTURE

Night train rides have proved to be popular events, and can be linked to provision of other business opportunities such as food, accommodation, photography and astronomy.

INTRODUCTION

Night train rides on the wealth of narrow-gauge railways in Wales provide an opportunity to exploit dark skies by running night time train rides outside normal opening times for special dark skies events which could involve, for example, astronomy, BBQs or cultural evenings (or combinations). Some railways already run specialist night time events (e.g. for Halloween, Ffestiniog Railway).

Destination stations may need assessing for dark sky quality with low light pollution for astronomy-linked events.

POTENTIAL MARKETS

Potentially all visitors:

| Group description | Visit Wales category |
|--------------------------------|---------------------------------|
| Young adventurers | Pre-family explorers |
| Active outdoor-loving families | Activity family explorers |
| Couples enjoying scenery | Scenic explorer couples |
| Older adventurous couples | Older cultural explorer couples |

Descriptions of these groups can be found in Appendix B.

KEY LOCATIONS

Please contact the railways listed below in order to establish the hours during which they are open to the public.

BRECON BEACONS NATIONAL PARK

Brecon Mountain Railway

SNOWDONIA NATIONAL PARK

- Bala Lake Railway
- Corris Railway (though just outside the National Park)
- Fairbourne Railway (though just outside the National Park)
- Ffeistiniog Railway
- Llanberis Lake Railway
- Talyllyn Railway
- Welsh Highland Railway

There are no small railways in Pembrokeshire.

CASE STUDIES

• Ffestiniog Railway Halloween nights: http://www.festrail.co.uk/content/publish/specialevents/433.shtml

KEY PARTNERS

Other organisations such as outdoor centres, charities etc. may run events that visitors can be pre-booked onto.

Page 38 TACP 8329

CONSTRAINTS

The railways run in most weather, but associated activities such as astronomy require clear or partially cloudy skies. Thus it may be advisable to organise a range of linked activities some of which do not depend on the weather.

SEASONALITY

This activity is suitable throughout the year.

| JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP | ОСТ | NOV | DEC |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| | | | | | | | | | | | |

ACCESS FOR ALL

Usually suitable for all abilities, with reservations for wheelchairs being possible on some trains.

SAFETY CONSIDERATIONS

Risk assessments will be required for public events.

SEE also

- 2.1 SAFETY ADVICE
- 2.2 ACTIVITIES AND ADVENTURES IN PROTECTED PLACES

EQUIPMENT/FACILITIES REQUIRED

The narrow gauge railways usually have safe car parking, toilet and refreshment facilities.

Astronomy events can be run outside if the weather is fine, but indoor venues may be required in the event that the weather is bad.

RELATED ACTIVITIES

Astronomy activities: All Year Dark Sky Astronomy, Periodic Dark Sky Astronomy

Physical activities: Moonlit Walks/Night Walking.

Cultural/historical activities and adventures: Night Photography.

Nature activities and adventures: Bat Walks.

ADDITIONAL INFORMATION

Railways are strictly regulated by law and the legislation must be followed.

Charity events could be run to involve the wider community; permissions for such events can be obtained from the National Park Authorities.

2.5.4 NIGHT PHOTOGRAPHY

There are business opportunities to provide night time photography events and courses which can be linked to other opportunities such as food, accommodation, astronomy events and sale or hire of equipment. They can also provide excellent marketing material.

INTRODUCTION

Photography is a very popular activity but getting good pictures of stars and the night sky requires more expertise and sometimes specialist equipment and processing. There are business opportunities to run night time photography events and courses which can be linked to other opportunities such as food, accommodation, astronomy events and sale or hire of equipment.

There are many websites offering advice on night time photography with advice on white balance, ISO, exposure, etc. for a range of night pictures such as:

- Nightscapes still pictures of the stars, planets and aurora; the moon is so bright that it dominates pictures of the stars so moonless nights are best for the stars
- Long exposure shots of the stars rotating through the sky, or capturing shooting stars or International Space Station passes
- Pictures through telescopes
- Sunrise and sunset pictures where there is still some ambient light
- Urban pictures with artificial lights

There are numerous local amateur photography clubs which provide advice and expertise, and could be included in wider activities.

Competitions can be held for the best dark sky pictures in different national parks and for different age groups (see also Sunrise and Sunset Adventure above).

POTENTIAL MARKETS

Potentially all visitors, though particularly suitable for:

| Group description | Visit Wales category |
|---------------------------|---------------------------------|
| Young adventurers | Pre-family explorers |
| Couples enjoying scenery | Scenic explorer couples |
| Older adventurous couples | Older cultural explorer couples |

Descriptions of these groups can be found in Appendix B.

KEY LOCATIONS

Page 40 TACP 8329

There are night photography opportunities throughout the national parks. For example, Mud & Routes have listed sites they recommend in Snowdonia: http://www.mudandroutes.com/snowdonia-national-park-aim-dark-sky-status/

CASE STUDIES

Dark Skies Wales run astrophotography workshops for beginner on astronomy, telescopes and astrophotography in the Brecon Beacons: http://darkskies.wales/workshops/

Landscape Uncovered and Huw Jones run bespoke workshops on telescopes, astronomy, technology, photography plus night time navigation. For more details contact: neil@landscapesuncovered.com or huw@huwjames.com

Creative Photography Holidays teach the technical and creative skills of photography and include dusk and dawn shoots in the Brecon Beacons and Pembrokeshire: http://www.breconbeacons.org/businesses/2720

Snowdonia National Park offer night sky astronomy and mythology courses at Plas Tan y Bwlch: http://www.eryri-npa.gov.uk/study-centre/public-courses/course-details/diddordebau-arbennig/the-night-sky2

DARK SKY WALES

Dark Sky Wales host workshops for beginners on astronomy, telescopes and astrophotography across Wales, as well as at the Brecon Beaons Observatory. They also run community based courses. Workshops and courses are hands-on allowing participants to become acquainted with the tools of the astronomers trade. http://darkskywalestrainingservices.co.uk/

KEY PARTNERS

Other organisations such as local colleges, outdoor centres, National Trust etc. may run photographic events that visitors can be pre-booked onto.

CONSTRAINTS

Best on clear or partially cloudy nights, though there may be opportunities for photography during thunder storms too.

SEASONALITY

This activity is suitable throughout the year.



ACCESS FOR ALL

Generally accessible for all, may depend locally on the quality of access paths and tracks to get to localities.

SAFETY CONSIDERATIONS

Risk assessments will be required for public events.

EQUIPMENT/FACILITIES REQUIRED

Camera equipment (digital SLRs, compacts, tripods, shutter release cables) could be loaned as part of workshops, as not everybody will have suitable cameras.

Astrophotography may require specialised telescopes with camera attachments to give good pictures of the moon, stars and planets.

Post-picture processing will require software and a computer.

RELATED ACTIVITIES

Astronomy activities: All Year Dark Sky Astronomy, Periodic Dark Sky Astronomy, Astronomy Society Events

Physical activities: Moonlit Walks/Night Walking.

Cultural/historical activities and adventures: Sunrise and Sunset Adventure, Night Train Ride Adventure, Welsh Beacons and Bonfires.

Nature activities and adventures: Bat Walks; Glow Worm Adventure, Badger Watching Adventure, Nocturnal Birds Listening Adventure.

2.5.5 WELSH BEACONS AND BONFIRES

Lighting beacons to form a Welsh network has potential to attract many visitors to enjoy a national, organised event. There would be associated business opportunities such as provision of food, accommodation, story-telling etc.

INTRODUCTION

Historically, lighting chains of beacons were a means of communication. The best known example is of the beacons lit to warn of the Spanish Armada in 1588, and the Brecon Beacons, as the name implies, were part of the national network. Historically, beacons were lit in a brazier or iron fire-basket on a large metal tripod which were filled with dry combustible material soaked in tar or pitch, ready to blaze up when ignited by flint and steel or by a match from a lantern. More recently, beacons have proved very popular events to mark the Queen's Silver, Golden and Diamond jubilees.

A Welsh chain of beacons could be used to link the national parks and other dark sky locations. This could be linked to national days such as St David's Day (a chain of Welsh dragons breathing fire, starting from Castell Dinas in Snowdonia, or from St Davids), the national Eisteddfod or even Wales winning the Six Nations, or be independent of them. There would be associated business opportunities such as provision of food, accommodation, story-telling etc.

Page 42 TACP 8329

A national event would take a lot of central coordination and effort to organise bonfires sites, transport of bonfire materials and safety assessments. It is essential to obtain permission from landowners, commoners and statutory agencies, etc.

Chains of beacons could be organised locally within each of the national parks—e.g. a 'Brecon Beacon' evening.

POTENTIAL MARKETS

Potentially all visitors:

| Group description | Visit Wales category |
|--------------------------------|---------------------------------|
| Young adventurers | Pre-family explorers |
| Active outdoor-loving families | Activity family explorers |
| Couples enjoying scenery | Scenic explorer couples |
| Older adventurous couples | Older cultural explorer couples |

Descriptions of these groups can be found in Appendix B.

KEY LOCATIONS

Beacon sites used for the Diamond jubilee in 2012:

http://www.telegraph.co.uk/news/uknews/the_queens_diamond_jubilee/9305353/Queens-Diamond-Jubilee-Beacons-map.html

CASE STUDIES

Diamond Jubilee beacons http://www.bbc.co.uk/news/uk-england-18297618

KEY PARTNERS

A range of private landowners and other organisations outside the National Parks (such as the National Trust, Cadw) would need to be involved to form national chains.

CONSTRAINTS

Low cloud and rain may limit the visibility.

Many sites are designated for wildlife and may be working commons. It is essential to seek permission of the landowner before organising any event.

Bonfires and ash residues could damage important scientific or historic sites so beacon site selection may need to be carefully considered.

SEASONALITY

This activity is suitable throughout the year.

| | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP | ОСТ | NOV | DEC | |
|--|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|--|
|--|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|--|

ACCESS FOR ALL

Some hilltop beacon sites may have limited access for the disabled, may depend locally on the quality of access paths and tracks; beacons would be visible from many places.

SAFETY CONSIDERATIONS

Risk assessments will be required for public events.

Fire risks to adjacent land will need to be managed.

Suggestions of linking beacons via lasers are not included because of air traffic and public safety concerns.

SEE also

2.1 SAFETY ADVICE

2.2 ACTIVITIES AND ADVENTURES IN PROTECTED PLACES

EQUIPMENT/FACILITIES REQUIRED

Beacons can be lit in in braziers if available, or directly on the ground. Consideration needs to be given to lighting beacons in the event of bad weather and wet fuel. Ensure this activity is permitted in the planned location..

Binoculars/telescopes may be useful for checking fires are lit in their early stages before becoming more widely visible.

RELATED ACTIVITIES

Astronomy activities: All Year Dark Sky Astronomy, Periodic Dark Sky Astronomy

Physical activities: Moonlit Walks/Night Walking.

Cultural/historical activities and adventures: Dark Skies Camping; Sunrise and Sunset Adventure, Night Train Ride Adventure, Night Photography.

Nature activities and adventures: Bat Walks; Glow Worm Adventure, Badger Watching Adventure, Nocturnal Birds Listening Adventure.

2.6 NATURE ACTIVITIES AND ADVENTURES

2.6.1 BAT WALKS

Page 44 TACP 8329

Evening bat walks with interpretation with expert guides are poplar events which can be linked to provision of other business opportunities such as food or accommodation, or sale/hire of equipment (e.g. bat detectors).

INTRODUCTION

There are 16 bats species in Wales which are widespread with some outstanding populations in the National Parks. Many bat populations are declining through a combination of development work that affects roosts, loss of feeding habitat, reduced insect abundance in the countryside, severance of commuting routes by roads and threats in the home including cats and some chemical treatments of building materials.

During the summer, bats roost during the day and typically come out just before dawn and after dusk to feed on insects. They find their prey by echo-location using high-frequency sounds, and they also use calls for navigation and communication. The breeding season is mainly June-August; young are left in roosts whilst the lactating mothers feed. During the winter bats hibernate and do not fly.

Bats can be easily seen after dusk when they are flying. Small electronic bat detectors allow bats to be heard by transposing the echolocation calls down to the sound frequencies that humans can hear.

POTENTIAL MARKETS

Potentially all visitors, though particularly suitable for:

| Group description | Visit Wales category |
|--------------------------------|---------------------------|
| Young adventurers | Pre-family explorers |
| Active outdoor-loving families | Activity family explorers |
| Couples enjoying scenery | Scenic explorer couples |

Descriptions of these groups can be found in Appendix B.

KEY LOCATIONS

There are numerous localities with bats in and on the outskirts of all National Parks (e.g. Stackpole, Llanberis) enabling widespread provision of bat walks.

CASE STUDIES

- Cobden's Hotel, Snowdonia National Park, have an annual pipistrelle bat count to monitor at the large populations which roosts in the eaves of the hotel. If you stay in the hotel in the top floor rooms you can hear the bats crawling in the roof space.
- National Trust's Stackpole Estate, Pembrokeshire Coast National Park, have an internationally important greater horseshoe bat roost and hold guided bat walks around the estate
- Pembrokeshire Coast National Park run 'Brilliant Bats' in the summer, a guided twilight stroll (with provided bat detectors) at Carew Castle.
- Slebech Park Hotel, Pembrokeshire Coast National Park, have bat evenings with expert talk and live CCTV coverage: http://www.slebech.co.uk/slebech/activities/
- Voyages of Discovery offer 1.5 hour guided bat walks at St David's Cathedral and surroundings, Pembrokeshire Coast National Park, where they watch bats hunting along the River Alun, try out a bat detector and hear tales of magic and mystery: http://www.ramseyisland.co.uk/bat-badger-walks/

KEY PARTNERS

Local bat ecologists may run professionally guided bat walks, and will usually hold a Bat licence.

Sources of contacts for local bat ecologists:

- Local bat groups who may be able to offer advice are given on the Bat Conservation Trust website: http://www.bats.org.uk
- CIEEM professional directory: http://www.cieem.net/members-directory (search using 1. Species = 'Bats', 2. Area/Country = United Kingdom which will then bring up a postcode area search facility)
- Natural Resources Wales: https://naturalresources.wales/about-us/contact-us/general-enquiries/?lang=en
- National Park Ecologists
- County Ecologists
- Vincent Wildlife Trust

BRECON BEACONS NATIONAL PARK

- Brecknock Bat group For all enquiries about the Brecknock Bat Group contact Diane Morgan: diane@justmammals.co.uk
- Valleys Bat group (southern Margin of Brecon Beacons) http://www.valleysbatgroup.org.uk/

PEMBROKESHIRE COAST NATIONAL PARK

Pembrokeshire Bat Group

SNOWDONIA NATIONAL PARK

- North Wales Mammal Group
- Gwynedd Bat Group: http://www.gwyneddbats.org.uk/

CONSTRAINTS

Bats will not fly when cold, very windy or when raining, but will otherwise fly in a range of conditions.

All bats and their roosts are protected by law and it is illegal to interfere with them. However, bats can be safely watched and listened to using ultrasonic detectors or infrared night vision detectors without affecting them. To minimise disturbance, it is advisable not to stand and watch bat directly in their flight paths or use flash photography.

SEASONALITY

Bats walks are confined to the summer activity months, typically April to October. During the winter (November-March) bats hibernate.

Page 46 TACP 8329



ACCESS FOR ALL

Generally accessible for those with disabilities, may depend locally on the quality of access paths and tracks.

SAFETY CONSIDERATIONS

Risk assessments will be required for public events.

Bats walks have been run successfully for many years. General night safety considerations such as finding safe routes without trip hazards or vehicles, safe access if adjacent to water features such as ponds or rivers (both good bat habitats), chances of inclement weather, provision of spare torches and batteries, etc.; will need planning in advance.

SEE also

- 2.1 SAFETY ADVICE
- 2.2 ACTIVITIES AND ADVENTURES IN PROTECTED PLACES

EQUIPMENT/FACILITIES REQUIRED

Safe place to view bats away from noise and light e.g. garden, grounds of hotel, grounds of castle or churchyards.

Typical equipment for detecting bats is a 'bat detector' which picks up ultrasonic echolocation calls made by the bats and converts them to audible frequencies. There is a range of bat detectors on the market which range from basic ones which allow detection of presence (rarely identifiable to which species of bat) to highly sophisticated ones which also record and analyse the signals to allow species identification. These range from price under £80 to over £1000: http://www.bats.org.uk/pages/bat detectors.html

Infrared night vision scopes augment bat detectors can be used to see bats flying or emerging from roosts. There are many available on internet shopping sites from £120 upwards, but are not essential to see bats as they can be easily seen with the naked eye until it is relatively dark.

Bat boxes can be put up in properties to attract bats.

Possible options of offering additional food at local facilities on return from bat walks.

RELATED ACTIVITIES

Astronomy activities: All Year Dark Sky Astronomy, Periodic Dark Sky Astronomy

Physical activities: Moonlit Walks/Night Walking.

Cultural/historical activities and adventures: Dark Skies Camping; Sunrise and Sunset Adventure, Night Train Ride Adventure.

Nature activities and adventures: Glow Worm Adventure, Badger Watching Adventure, Nocturnal Birds Listening Adventure.

ADDITIONAL INFORMATION

Bat Conservation Trust: http://www.bats.org.uk

Making gardens bat-friendly: http://www.bats.org.uk/pages/encouraging bats.html

Bats and lighting: http://www.bats.org.uk/pages/bats and lighting.html

Some visitor attractions have CCTV inside bat roosts to show bat presence/activity during the day (this may require a licence) which could provide further interest to visitors, e.g.:

- Lesser Horseshoe Bat maternity roost Batcam at Nantclwyd y Dre, Denbighshire http://www.chesterzoo.org/attractions-and-exhibits/web-cams/bat-cam
- Slebech Park Hotel, Pembrokeshire Coast National Park http://www.slebech.co.uk/slebech/activities/

2.6.2 GLOW WORM ADVENTURE

Evening walks to look for glow worms, either locally or through interpretation with an expert guide. These can be linked to provision of other business opportunities such as food or accommodation provision.

INTRODUCTION

Despite the name, glow worms are usually adult female beetles (Latin name *Lampyris noctiluca*). They are quite widespread but locally distributed in Wales. Typical habitats are gardens, hedgerows, cliffs, woodland rides, sand dunes heathland and even valleys in Wales, usually where their prey (small snails) are also frequent. Populations vary in size from year to year.

Glow worms start to glow soon after dusk as soon as it is tolerably dark (this is often the best time to see them), and continue well into the night. They are usually found on the ground or sometimes on plants stems up to about knee height.

The glow is produced in the abdomen of the wingless female to attract flying males to mate with her. The females live for only a few weeks and once mated, lay their eggs and soon die. After a few weeks the eggs hatch into larvae, and they remain as larvae for 1-2 summers. Larvae may also glow very weakly and for short periods.

The glow is a form of bioluminescence caused when a molecule called luciferin is oxidised to produce oxyluciferin, with the enzyme luciferase acting as a catalyst.

There are a few other invertebrates (lesser glow worm, a few caterpillars and centipedes) which can also glow, but these are much rarer. Fireflies are not present in the UK.

Further general information: http://www.glowworms.org.uk

Page 48 TACP 8329

It is advisable to lead excursions to sites where glow worms are already known, though they are probably more widespread than the current records suggest. Sites need to be quite dark as the glow worms are only visible from a few metres away.

National biodiversity network map summarising records available at: https://data.nbn.org.uk/ - search for 'glow worm', then use 'interactive map'. There are also facilities for downloading records.

POTENTIAL MARKETS

Potentially all visitors, though particularly suitable for:

| Group description | Visit Wales category |
|--------------------------------|---------------------------|
| Young adventurers | Pre-family explorers |
| Active outdoor-loving families | Activity family explorers |

Descriptions of these groups can be found in Appendix B.

KEY LOCATIONS

All National Parks have glow worms, details of which can be found on the interactive pages of the National Biodiversity Network Gateway website (https://data.nbn.org.uk/). The best locations will be where glow worms are already known, for example.

Pembrokeshire National Park - Freshwater East dunes

Snowdonia National Park - Plas y Brenin – the National Mountain Sports Centre has a small colony of glow worms: http://pyb.co.uk/enviro-detail.php?id=67/

CASE STUDIES

A number of organisations have lead glow worm walks in England (e.g. National glow worm survey, National Trust, Essex Wildlife Trust, Exmoor National Park) but none are currently run in Wales.

Pembrokeshire Coast National Park include glow worms as a point of interest on their Pembrokeshire Coast National Trail leaflet: http://nt.pcnpa.org.uk/website/PDF/walk info.asp?s=14&swd=y&sfi=y

KEY PARTNERS

Other organisations such as the National Trust, Wildlife Trusts, and other ecology and wildlife organisations may have bat specialists or may run events that visitors can be pre-booked onto.

Local entomologists may be able to lead walks or provide information. Some sources of contacts for local entomologists are as follows:

- National glow worm survey website: http://www.glowworms.org.uk/
- CIEEM professional directory: http://www.cieem.net/members-directory (search using 1. Species = 'Terrestrial invertebrates', 2. Area/Country = United Kingdom which will then bring up a postcode area search facility)

- Natural Resources Wales: https://naturalresources.wales/about-us/contact-us/general-enquiries/?lang=en
- National Park Ecologists

CONSTRAINTS

Glow worms are relatively insensitive to weather and can be found in a range of conditions from light rain to clear skies.

SEASONALITY

Peak times to see glow worms are June-July with occasional reports in May and August.



ACCESS FOR ALL

Access for disabled may be limited depending on the sites, unless paths or tracks have a suitable surface. Roadsides may be accessible but there then may be significant risks from vehicles.

SAFETY CONSIDERATIONS

Risk assessments will be required for public events.

SEE also

- 2.1 SAFETY ADVICE
- 2.2 ACTIVITIES AND ADVENTURES IN PROTECTED PLACES

EQUIPMENT/FACILITIES REQUIRED

Safe place to view glow worms away from light (e.g. garden, grounds of castle or churchyard, hedgerows) preferably with safe car parking, toilet and refreshments for organized walks.

Possible option of offering additional food at local facilities on return.

RELATED ACTIVITIES

Astronomy activities: All Year Dark Sky Astronomy, Periodic Dark Sky Astronomy

Physical activities: Moonlit Walks/Night Walking.

Cultural/historical activities and adventures: Dark Skies Camping; Sunrise and Sunset Adventure, Night Photography.

Nature activities and adventures: Bat Walks; Glow Worm Adventure, Badger Watching Adventure, Nocturnal Birds Listening Adventure.

ADDITIONAL INFORMATION

Page 50 TACP 8329

There is concern that artificial lighting is could cause affects as there is no doubt that male glow worms are attracted to artificial lighting of any colour and this must distract them from finding females. Studies in Conway suggest some sodium lamps are especially bad at attracting males.

Glow worms are not protected species so can be searched for any time. They do not keep well in captivity and are best left in their natural habitats where all their specific requirements are met.

Reports of glow worms can be fed into the National Glow Worm survey: http://www.glowworms.org.uk

2.6.3 BADGER WATCHING ADVENTURE

Small, personal guided trips in early evening to watch badgers in setts or at feeding sites at accommodation are very popular, and provide some small business opportunities. As badgers are protected species, trips should be organised by wildlife specialists and knowledge surrounding the location of setts, carefully managed.

INTRODUCTION

Badgers are amongst the UK's favourite nocturnal creatures; most people have heard about but few have seen except as carcases on roadsides. Organised badger watches at known, protected setts have proved to be very popular for individuals or small family groups. They provide small business opportunities either for guided walks or by attracting clients to properties where badgers can be seen.

Badgers are protected and so are the setts (burrows) they live in under the Protection of Badgers Act 1992. There are individuals and groups who, despite the protection badgers are afforded by the law, actively seek to destroy badgers and their habitats. It is therefore, important to consider this when organising and publicising badger watching. Please consider that it is an offence to disturb a badger when it is occupying a sett and so take special care not to inadvertently interfere with the sett or its opening when planning any badger watching activity.

The Eurasian Badger (*Meles meles*) is a member of the weasel and stoat family (*Mustelidae*). They are common and widespread in Wales. Most badgers live in social groups of typically 3-15 individuals. Badgers live underground in 'setts', typically with a main sett dug into sloping ground and several outlying setts. They have defined territories where they forage for earthworms, beetles, and bees and wasps' nests, but they will also take small mammals, birds, carrion, cereals, fruit and fungi. Badgers have only one litter of 1-5 cubs once a year, typically in February. The mother feeds the cubs in the sett and usually come above ground in late April. The cubs are usually fully weaned after about 15 weeks and may stay with the sett or disperse to find their own territories in the autumn. Badgers have a very good sense of smell and hearing, and have reasonable night vision capability.

Badgers are nocturnal and often emerge soon after dusk, which is the best time to see them. The two main ways to see them are to either watch the setts, or watch them at feeding sites.

1. If watching the setts, plan safe access routes in advance during the day as badgers are sensitive to noise and scent. Chairs can be put out in advance. Arrive 30-60 minutes before dusk, keep downwind (avoid perfume and fragrant fabric conditioners) at least 20-30 m away and do not walk over the sett (they will hear the vibrations and delay coming out). Wear dark, soft clothing and blend into background rather than being visible as a silhouette. Sit quietly and wait; communicate by whisper or touch. Binoculars, night vision scopes and red torches can help if used carefully. If badgers have not appeared by 1-2 hours after dark, try another night.

2. Badgers from local setts can be attracted to feeding sites in gardens or other sites by routinely leaving out peanuts, peanut butter, grapes, sweet corn or even dog/cat food and in summer water. This can provide a more reliable means of seeing badgers than watching setts. Badgers attune to low level lighting from houses so can be easily seen from inside, and some have been 'trained' to come out to feed at particular times and are alerted to food being put out by briefly banging pans. There are some reports that badgers avoid visiting whilst cats and dogs are outside.

Remote CCTV can also be set up to watch setts, which can then be watched in comfort inside. Foxes, hedgehogs and deer might also be seen whilst watching for badgers.

Further advice on how to watch badgers is given by the Badger Trust: http://www.badger.org.uk/#!badger-watching/ehesf

POTENTIAL MARKETS

Potentially all visitors:

| Group description | Visit Wales category |
|--------------------------------|---------------------------------|
| Young adventurers | Pre-family explorers |
| Active outdoor-loving families | Activity family explorers |
| Couples enjoying scenery | Scenic explorer couples |
| Older adventurous couples | Older cultural explorer couples |

Descriptions of these groups can be found in Appendix B.

KEY LOCATIONS

Pembrokeshire Coast National Park has a particularly high density of badgers; Snowdonia and the Brecon Beacons National Parks have lower densities.

Due to the legal protection of badgers, badger watching should only be taken on land which is either private or protected from persecution, and the location of setts should not be made public knowledge.

CASE STUDIES

PEMBROKESHIRE COAST NATIONAL PARK

Voyages of Discovery offer 1.5 hour evening badger walks, where they have exclusive access to some prime badger habitat. They advise bringing outdoor shoes and warm clothes, bring wet weather gear in case of rain: http://www.ramseyisland.co.uk/bat-badger-walks/

Cwmconnell Farm, near Moylgrove in the Pembrokeshire National Park offers watching badgers visit their terrace above a sunken wildlife garden: lisa-godfrey@sky.com

Glanmoy Lodge Guest House, Tref-wrgi Road, Goodwick, is a guest house with badger watching opportunities available in garden: www.glanmoylodge.co.uk

BRECON BEACONS NATIONAL PARK

Page 52 TACP 8329

Black Mountain Caravan and Camping Park see badgers very late at night/early hours of the morning: http://www.blackmountainholidays.co.uk/Wildlife.htm

KEY PARTNERS

Badger watching is usually run as a local attraction rather than as a large group event. Local mammal ecologists, who should hold a badger licence, may be able to run professionally guided badger watching events.

Local badger expert contacts may be obtained from some of the following sources:

- Local badger groups: http://www.badger.org.uk/#!wales/zkc7f
- CIEEM professional directory: http://www.cieem.net/members-directory (search using 1. Species = 'badgers', 2. Area/Country = United Kingdom which will then bring up a postcode area search facility)
- Natural Resources Wales: https://naturalresources.wales/about-us/contact-us/general-enquiries/?lang=en
- National Park Ecologists
- County Ecologists

Other organisations such as the National Trust, Wildlife Trusts, and other ecology and wildlife organisations may have run badger watches that it may be possible to pre-book customers onto.

CONSTRAINTS

Watching badgers is considerably more comfortable in the dry, but the choice is down to individuals. Badgers do not mind the rain and visit their feeding sites (warm, damp conditions often brings out their favourite food earthworms in abundance), but they tend to stay underground during very cold weather when the ground is frozen so they cannot hunt.

SEASONALITY

Badgers are active all year and do not hibernate. The December-February period may have little activity, but they are more active during the breeding season and summer (cubs can be especially active in May and June close to setts).



ACCESS FOR ALL

Where badgers are attracted to gardens or viewing using remote CCTV there may be access for all. Access to view setts may be depend locally on the quality of access paths and tracks.

SAFETY CONSIDERATIONS

Usually low risk, depending on access to setts.

SEE also

2.1 SAFETY ADVICE

2.2 ACTIVITIES AND ADVENTURES IN PROTECTED PLACES

EQUIPMENT/FACILITIES REQUIRED

- Safe place to view badgers away from unpredictable noise and disturbance e.g. garden, grounds of hotel, woodlands, grounds of castle or churchyards with safe access.
- Binoculars with a low magnification and a large diameter (e.g. 7 x 56) help to gather light and aid vision in low light and enable distance from the setts to minimise disturbance.
- A dim torch, preferably covered with red cellophane may be used.
- Infrared night vision scopes can be used to see badgers in poor light conditions and help spot them from a distance (many available on internet shopping sites from £120 upwards).
- Camera traps and remote CCTV can be used to watch setts remotely with minimum disturbance to the badgers.
- Possible option of offering additional food on return at local facilities.

RELATED ACTIVITIES

Astronomy activities: All Year Dark Sky Astronomy, Periodic Dark Sky Astronomy

Physical activities: Moonlit Walks/Night Walking.

Cultural/historical activities and adventures: Dark Skies Camping; Sunrise and Sunset Adventure, Night Photography.

Nature activities and adventures: Bat Walks; Glow Worm Adventure, Nocturnal Birds Listening Adventure.

ADDITIONAL INFORMATION

Badgers and their setts are protected by law and it is illegal to interfere with them (Protection of Badgers Act 1992: http://www.legislation.gov.uk/ukpga/1992/51/section/3).

Due to the association of bovine tuberculosis with badgers, they are being culled in some parts of the UK which has given rise to significant controversy; there is currently no badger culling in Wales.

National badger week occurs in late June every year, often with local events.

Badger Trust: http://www.badger.org.uk/

Some educational material for children is available from the Badger Trust http://www.badger.org.uk/#!teaching-resources/ogg7s

2.6.4 NOCTURNAL BIRDS LISTENING ADVENTURE

Page 54 TACP 8329

Nightjars and owls are nocturnal birds which can be heard calling at night in the Welsh National Parks. The calls provide an audio adventure within the night soundscape. There are business opportunities related to guided walks or providing unusual nature attractions.

INTRODUCTION

Nightjars and owls are truly nocturnal birds which call at night in the Welsh National Park and provide an evening adventure as part of the night soundscape. The other truly nocturnal birds are corncrakes (extinct in Wales) and nightingales (recently colonising Wales but still rare). Some birds such as robins may also sing at 'night' in areas with light pollution.

NIGHTJARS

Nightjars are birds which come to the UK to breed in summer. They are widespread in Britain, being most numerous in southern England but with records widely in Wales including all the National Parks. There are thought to be about 4600 breeding males in the UK (females are harder to census). They are found on heathlands, moorlands, in open woodland with clearings, and in recently felled conifer plantations. They are nocturnal, and hunt for moths, flies and beetles at night, often over woodland. During the day they roost on the ground, their greyish-brown, mottled feathers providing excellent camouflage.

Nightjars are best listened for after dusk on warm, still, summer evenings and are usually first noticed through the male's very distinctive churring song. Males sit on the tops of trees and call to attract mates and proclaim their territories, especially in May and June. The calls travel for about 500 m (depending on the wind) and often several males can be heard calling at a site. When flying between perches they have a distinctive, silent, looping flight.

In their breeding areas, nightjars can often be heard directly from car parks or by walking along forestry tracks, proving good access without any need to disturb them.

OWLS

There are five species of owl in Wales, of which barn owl, little owl, short-eared owl and tawny owl are widespread whilst long-eared owl occurs in North Wales. They hunt over a wide range of habitats from open grassland to dense woodland. They all call at night, the tawny owl being the typical hooting owl known to most people whilst the other species tend to sound more like screeches.

Owls can be heard from many places in the countryside, and occasionally in towns and villages.

Calls of all species can be heard on the RSPB bird guide website and BBC Radio 4 Tweet of the day:

- https://www.rspb.org.uk/discoverandenjoynature/discoverandlearn/birdguide/
- http://www.bbc.co.uk/programmes/b01s6xyk

POTENTIAL MARKETS

Potentially all visitors:

| Group description | Visit Wales category |
|--------------------------------|---------------------------------|
| Young adventurers | Pre-family explorers |
| Active outdoor-loving families | Activity family explorers |
| Couples enjoying scenery | Scenic explorer couples |
| Older adventurous couples | Older cultural explorer couples |

Descriptions of these groups can be found in Appendix B.

KEY LOCATIONS

BRECON BEACONS NATIONAL PARK

- Nightjar locations:
 - Cretan/ Caeo Forests
 - Glasfyndd Forest
 - Brechfa Forest
 - Mynydd Ddu
 - Langorse Lake

PEMBROKESHIRE COAST NATIONAL PARK

- The National Trust Stackpole estate has tawny owls: https://www.nationaltrust.org.uk/features/owl-haunts-in-wales
- Carew, Castell Henllys and St David's Cathedral are other potential owl locations
- Tretio Common near St David's, and Minwear Wood and Canaston Woods have had nightjars.

SNOWDONIA NATIONAL PARK

- Nightjars: Gwaith Powdwr Nature Reserve, Penrhyndeudraeth.
 http://www.northwaleswildlifetrust.org.uk/reserves/gwaith-powdwr
- The National Trust land at Craflwyn has owls.
- Yr Ysgwrn, Plas Tan-Y-Bwlch, Abergwynant and Coed-y-Brenin are other potential locations

CASE STUDIES

RSPB run nightjar walks in Suffolk on their heathland. They recommend bringing a small torch, long-sleeved and dark coloured clothing, insect repellent and sturdy closed footwear as the walk will be over rough and uneven ground in the darkness. As the heathland reserve is a wild location with fence and kissing gates to keep the livestock inside, fully wheelchairs the path is not accessible by push chairs: http://www.rspb.org.uk/discoverandenjoynature/seenature/events/details.aspx?id=tcm:9-281066

Black Mountain Caravan and Camping Park note their area is well known for nightjars, barn owls and little owls: http://www.blackmountainholidays.co.uk/Wildlife.htm

KEY PARTNERS

Page 56 TACP 8329

North Wales Wildlife Trust (www.northwaleswildlifetrust.org.uk) and Brecknock Wildlife Trust

Other organisations such as the RSPB, British Trust for Ornithology, National Trust and other ecology and wildlife organisations may run events that it may be possible to pre-book customers onto.

CONSTRAINTS

All birds tend to avoid activity in the rain and storms, but otherwise they will be active on clear or cloudy nights.

Breeding birds are protected by legislation but it is possible to listen to them without causing any disturbance.

Nightjar is a Species of European Conservation Concern (SPEC 2) and protected under Annex 1 of the EU 'Birds' Directive (Directive on the conservation of wild birds79/409/EEC).

The barn owl is listed on Schedule 1 of the Wildlife and Countryside Act, 1981 so the birds, their nests, eggs and young are fully protected at all times throughout the UK.

SEASONALITY

NIGHTJARS

Nightjars are only present in the summer, with peak calling times in May-June.



OWLS

This activity is suitable throughout the year.

| JAN | FEB MAR | APR MAY | JUN JUL | AUG SEP | ост | NOV DEC | |
|-----|---------|---------|---------|---------|-----|---------|--|
|-----|---------|---------|---------|---------|-----|---------|--|

ACCESS FOR ALL

This adventure is particularly suited to those with visual impairment. Car parks should be accessible for all; access into the heathland or woodland habitats may depend on the local quality of access paths and tracks.

SAFETY CONSIDERATIONS

Risk assessments will be required for public events.

SEE also

- 2.1 SAFETY ADVICE
- 2.2 ACTIVITIES AND ADVENTURES IN PROTECTED PLACES

EQUIPMENT/FACILITIES REQUIRED

If there is sufficient quiet space at a property, owl nest boxes can be put up to attract owls (it is thought nesting sites limit the population sizes of some species such as barn owls) to provide additional wildlife interest for visitors.

Possible option of offering additional food on return at local facilities.

RELATED ACTIVITIES

Astronomy activities: All Year Dark Sky Astronomy, Periodic Dark Sky Astronomy

Physical activities: Moonlit Walks/Night Walking.

Cultural/historical activities and adventures: Dark Skies Camping; Sunrise and Sunset Adventure, Night Photography.

Nature activities and adventures: Bat Walks; Glow Worm Adventure, Badger Watching Adventure.

ADDITIONAL INFORMATION

NIGHTJARS

https://www.rspb.org.uk/discoverandenjoynature/discoverandlearn/birdguide/name/n/nightjar/

http://www.bou.org.uk/the-secret-lives-of-nightjars/

http://brecknockwildlifetrust.org.uk/nightjar%20tracking.html

OWLS

http://www.rspb.org.uk/discoverandenjoynature/discoverandlearn/birdguide/families/owls.aspx

http://www.barnowltrust.org.uk

Page 58 TACP 8329

3 DARK-SKIES-FRIENDLY BUSINESS INITIATIVES

3.1 TRAINING

Over 50 Brecon Beacons Dark Sky Ambassadors have been trained by the National Park Authority and Brecon Beacons Park Society about the night skies and how they can be enjoyed – further information is available at: http://www.breconbeacons.org/darkskyambassadors. These Ambassadors have also undertaken a three-day National Park training programme so have a real insight into the National Park.

Dark Skies Wales can train local business about the benefits of Dark Skies Tourism and how to attract active and engaged tourists in off or quiet seasons. Further information is available at: http://darkskies.wales/events/

The International Dark Skies Association website has a series of free educational materials, videos and presentations available at: http://darksky.org/resources/public-outreach-materials/

Local Astronomy Societies (Details of some of the Astronomy Societies operating within the National Parks are presented in Table 3) often hold lectures and workshops through the year which can be of great educational value about dark skies and a source of local contacts. There are small membership fees.

3.2 ADVICE

Maintaining and improving the Dark Skies is a key objective of the International Dark Skies Reserves; it does not mean turning off all the lights. Lighting which is more environmentally friendly, of better quality and more effective in directing light where it is needed reduces light pollution and carbon emissions and is also better for nocturnal wildlife. There may be cost savings from use of well-designed lighting only at appropriate times of night.

The following advice to minimize light pollution is provided by Snowdonia National Park (http://www.eryrinpa.gov.uk/looking-after/dark-skies/lighting):

- Lights should be switched on only when needed.
- Only light areas that need it.
- Light should not be brighter than necessary.
- Minimize blue light emissions.
- Use lights that are fully shielded and pointing downwards more information available at: http://www.eryri-npa.gov.uk/ data/assets/pdf file/0008/657989/LightingBasicGuidelines.pdf

Planning Guidance For Lighting is detailed below.

Further advice on lighting is given by the International Dark Skies Association website (http://darksky.org/) including tactful advice on dealing with light spill from adjacent properties (http://darksky.org/lighting/my-

<u>neighbors-lighting/</u>). Light spill from urban/municipal lighting can also be problem and great steps have been already made to reduce their impact in the National Parks.

Quality outdoor lighting design reduces energy use, carbon emissions, saves money and allows all to enjoy the night sky. Installing quality outdoor lighting could cut energy use by 60–70%. It should be fully shielded and direct light down where it is needed, not into the sky. Dimmers, motion sensors and timers can help to reduce illumination levels and new lighting technologies (e.g. warm-white LEDs and compact fluorescents) can reduce energy use.

Light spill from indoor lighting can be reduced by turning off unnecessary lights (particularly in empty office buildings at night) and using blinds and curtains. Thermal blackout blinds have the advantage of stopping light spill out whilst keeping heat in at the same time.

Appropriate lighting can be fitted at relatively little cost to existing properties, or designed in at the planning stage for new properties. Planning Guidance For Lighting is detailed below.

3.3 MEASURING DARK SKIES

The darkness of the sky can be measured to indicate the quality of the night sky using electronic meters (the results are presented in non-intuitive units of magnitudes per square arcsecond). The readings can be used to advertise dark sky credentials of properties and venues, and assess changes to light pollution around properties from improvements lighting.

- A range of commercial sky quality meters are available from approximately £100 (various internet sources, including: http://www.unihedron.com/projects/darksky/.
- 'Dark Sky Meter' is an iPhone app by DDQ for measuring the night sky quality: https://itunes.apple.com/gb/app/dark-sky-meter/id602989060?mt=8

3.4 PLANNING GUIDANCE FOR LIGHTING

Following planning guidance and draft planning guidance can help maintain the dark skies and minimise costs and delays for new developments or redevelopments. The guidance only applies to new developments and not retrospectively to existing developments.

Brecon Beacons National Park has prepared Supplementary Planning Guidance to minimise light pollution: http://www.beacons-npa.gov.uk/wp-content/uploads/Obrusive-Lighting-SPG-.pdf

Snowdonia National Park is preparing Supplementary Planning Guidance to minimise light pollution: http://www.eryri-npa.gov.uk/looking-after/dark-skies/planning

Other useful guidance is given on the Northumberland National Park website:

 $\underline{http://matrix.northumberlandnationalpark.org.uk/livingin/planning/northumberland-international-dark-sky-park-lighting-master-plan}$

Page 60 TACP 8329

3.5 NOCTURNAL WILDLIFE ENHANCEMENT

3.5.1 EFFECTS OF LIGHT POLLUTION ON WILDLIFE

Artificial light at night can have a negative and sometimes lethal effects on animals such as birds, mammals and insects by:

- changing their behaviour
- attracting them to light
- dazzling them with light
- increasing predation
- disruption to the timing of life cycles, breeding etc.

Further information is available at: http://darksky.org/light-pollution/wildlife/.

Snowdonia National Park list some of the effects in the UK, further information is available at: http://www.eryrinpa.gov.uk/looking-after/dark-skies/biodiversity

3.5.2 PROVISION OF OWL NEST BOXES

Provision of owl nest boxes can attract owls to properties to nest, potentially giving a unique selling point for charismatic species like barn owls. Owl boxes can be made from plans or purchased from c. £40 (many internet suppliers), and can be put up in buildings or outside. Some boxes incorporate fibre-optic cameras which enable remote viewing of activity in nest boxes as an added attraction. Note that all nesting birds are legally protected from disturbance, but can be watched without interference.

Further information is available at:

- https://www.rspb.org.uk/makeahomeforwildlife/advice/helpingbirds/nestboxes/owlskestrels/barnowl/
- http://www.barnowltrust.org.uk/barn-owl-nestbox/barn-owl-nestboxes/

3.5.3 PROVISION OF BAT BOXES

Provision of bat boxes around properties can augment local bat populations which may provide a unique selling point. Bat boxes can be made from plans or purchased from c. £15 (many internet suppliers), and can be put up outside properties or in trees. Bat boxes tend to be small and dark and thus not suitable for fibre-optic cameras. Note that all bat species are legally protected from disturbance, but can be watched flying without interference.

Further information is available at: http://www.bats.org.uk/pages/bat boxes.html#Making%20your%20own

APPENDICES

APPENDIX A – ADDITIONAL ACTIVITIES AND ADVENTURES

The following additional activities and adventures may be suitable for trade development to utilise the Dark Skies of the national parks:

ASTRONOMY

- Night navigation by stars
- Stone Circles / Archaeo-astronomy events

PHYSICAL

- Geocaching at night/orienteering
- Horse riding at night
- Night fishing

CULTURAL

- Diwali festival of lights (religious festival
- Film nights/outdoor cinema events
- Halloween/Calan Gaeaf (Pagan Winter Fest) events
- · Light art at night
- Lighthouse visits at night
- Midnight feast and picnics
- Music events
- Myths and legends story telling about the night
- Outdoor theatre events
- Yoga and meditation at night

NATURE

- Bio Blitz (looking at all wildlife present) at night
- Hedgehog spotting
- Infra-red camera walks/wildlife safari at night
- Moth trapping
- Pine martin watching
- Marine bioluminescence watching

APPENDIX B – VISIT WALES INDEPENDENT EXPLORER MARKET SEGMENT DEFINITIONS

| Segment | Description |
|------------------------------------|--|
| Older Cultural Explorer Couples | Older (96% 40+), married, no young children living with them. They tend to be more ABC1 and in the higher income brackets. Main types of holidays taken are sightseeing and city-breaks Low preference for theme/ holiday parks, caravanning, touring, activities and shopping Good range of historical attractions is of high importance to this segment Interesting towns and cities, good quality accommodation and beautiful scenery are also very important to them They like to learn about the local way of life and culture of the places they visit; and enjoy discovering new experiences and places to visit within the United Kingdom, so holiday is more to them than just a sunny beach |
| Scenic Explorer Couples | Older (95% 40+), married, no young children living with them, not highly differentiated on social grade and income (just slightly higher). More likely than other segments to be touring Beautiful scenery and beautiful unspoilt countryside, flora and fauna are the main things they are looking for when choosing a holiday, followed by beautiful coastline as well as good deals on accommodation Suitability for families, trendiness, activities (apart from walking) as well as short travel time do not feature prominently in their decision They prefer to travel independently when taking holidays and breaks, they like to visit places that are still comparatively undiscovered and they prefer to take holidays off the beaten track |
| Active Family Explorers | The vast majority (94%) are below the age of 50 and all of them live in households with children under the age of 15. Most of them are ABC1 (67%) They consider themselves adventurous and try to go somewhere different on holiday every time. They also like to learn about the local way of life and culture of the places they visit and family traditions and heritage are important to them They are looking for places that offer lots of things for children to do in all weathers Providing their children with new experiences and opportunities is very important to them |
| Pre-Family Explorers | The vast majority (72%) are below the age of 35 and all of them live in households without any children under the age of 15. Most of them are ABC1 (69%) and they take a lot of holidays, short breaks or days out They enjoy discovering new experiences and places to visit within the United Kingdom and try to go somewhere different on holiday every time They are the most obviously active of Wales' target market segments: Wales as an outdoor playground is an important motivator for them |

APPENDIX C – VISITOR SURVEY QUESTIONS

| Title: | Dark Skies: Brilliant Parks - visitor survey | | | | | |
|--------------|--|--|--|--|--|--|
| Description: | Pembrokeshire Coast, Brecon Beacons and Snowdonia National Park Authorities are developing a suite of activities and adventures which can be carried out safely at night. Your answers to the following questions will help us develop these activities and adventures. | | | | | |

| Question | Explanation | Answers |
|--|---|--|
| Which of these options best describes you? | | Activity family explorer Older cultural explorer couple Pre-family explorer Scenic explorer couple Other |
| How often do you participate in nature based activities? | e.g. listening for nightjars and looking for glow worms | NeverSometimesRegularly |
| How often do you participate in physical activities? | e.g. walking, cycling, running and kayaking | NeverSometimesRegularly |
| How often do you participate in astronomy based activities? | e.g. star gazing and photography | NeverSometimesRegularly |
| How often do you participate in historical/cultural related activities? | e.g. music events, night train rides and beacons | NeverSometimesRegularly |
| Which option best describes the way you usually engage in activities whilst in the National Parks? | | Independent of a tourism provider Through a tourism provider A mix of the above |
| If you have any other comments then please add them below. | | |
| Please leave your e-mail address/telephone number if you would be interested in helping further with this project. | | |

APPENDIX D – VISITOR SURVEY RESULTS

| Activity family explorer | Older cultural explorer couple | Pre-family explorer | Scenic explorer couple | Other | Total |
|--------------------------|--------------------------------|---------------------|------------------------|-------|-------|
| 10 | 5 | 12 | 10 | 13 | 50 |

| How often do you participate in nature based activities? | Never | Sometimes | Regularly | No answer |
|--|-------|-----------|-----------|-----------|
| Activity family explorer | 1 | 4 | 5 | 0 |
| Older cultural explorer couple | 0 | 0 | 4 | 1 |
| Pre-family explorer | 2 | 6 | 4 | 0 |
| Scenic explorer couple | 2 | 2 | 6 | 0 |
| Other | 0 | 8 | 5 | 0 |
| Total | 5 | 20 | 24 | 1 |

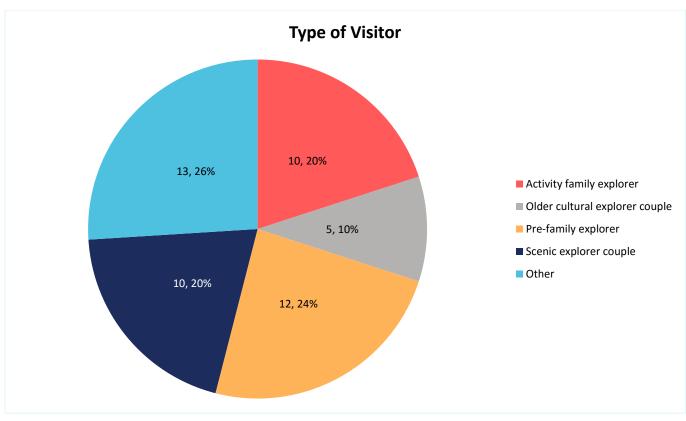
| How often do you participate in physical activities? | Never | Sometimes | Regularly | No answer |
|--|-------|-----------|-----------|-----------|
| Activity family explorer | 0 | 4 | 6 | 0 |
| Older cultural explorer couple | 0 | 2 | 3 | 0 |
| Pre-family explorer | 0 | 4 | 8 | 0 |
| Scenic explorer couple | 0 | 3 | 7 | 0 |
| Other | 0 | 4 | 9 | 0 |
| Total | 0 | 17 | 33 | 0 |

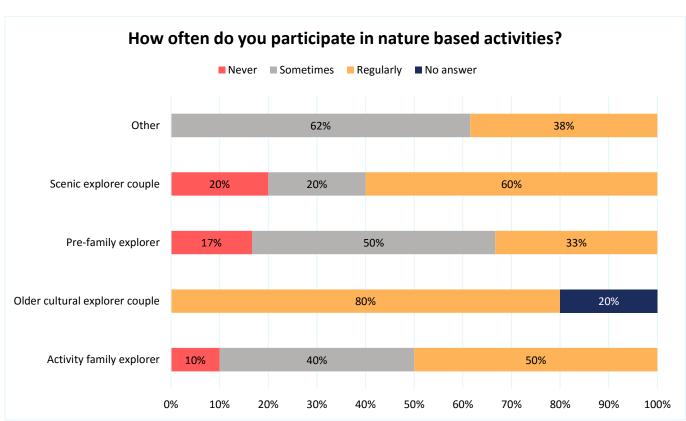
| How often do you participate in astronomy based activities? | Never | Sometimes | Regularly | No answer |
|---|-------|-----------|-----------|-----------|
| Activity family explorer | 1 | 9 | 0 | 0 |
| Older cultural explorer couple | 2 | 2 | 1 | 0 |
| Pre-family explorer | 2 | 9 | 1 | 0 |

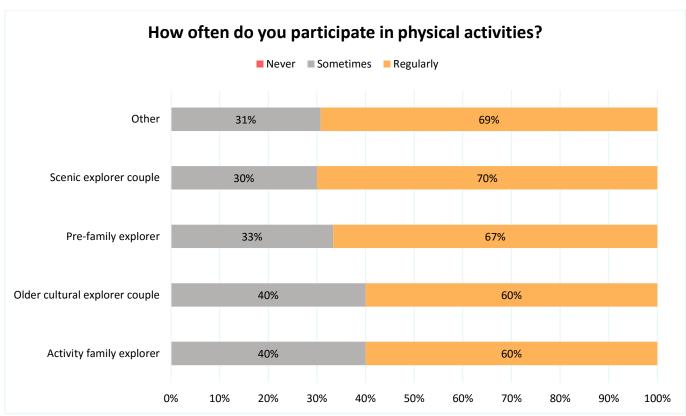
| How often do you participate in astronomy based activities? | Never | Sometimes | Regularly | No answer |
|---|-------|-----------|-----------|-----------|
| Scenic explorer couple | 3 | 3 | 4 | 0 |
| Other | 3 | 7 | 3 | 0 |
| Total | 11 | 30 | 9 | 0 |

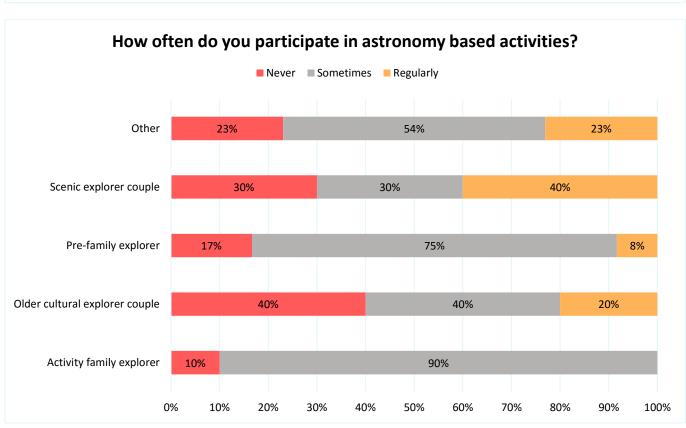
| How often do you participate in historical/cultural related activities? | Never | Sometimes | Regularly | No answer |
|---|-------|-----------|-----------|-----------|
| Activity family explorer | 3 | 5 | 2 | 0 |
| Older cultural explorer couple | 0 | 1 | 4 | 0 |
| Pre-family explorer | 1 | 11 | 0 | 0 |
| Scenic explorer couple | 0 | 10 | 0 | 0 |
| Other | 3 | 9 | 1 | 0 |
| Total | 7 | 36 | 7 | 0 |

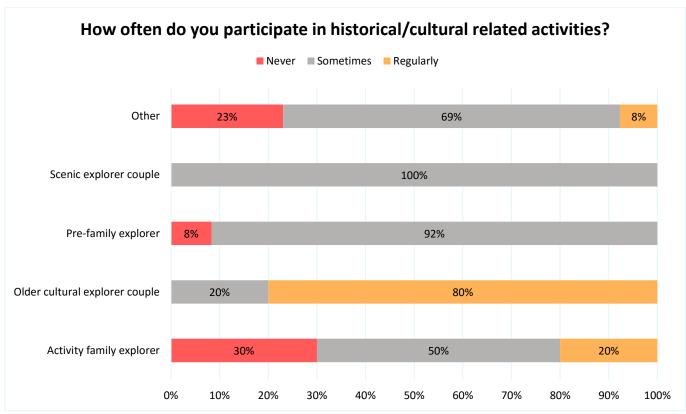
| Which option best describes the way you usually engage in activities whilst in the National Parks? | Independent of a tourism provider | Through a tourism provider | A mix of the above | No answer |
|--|-----------------------------------|----------------------------|--------------------|-----------|
| Activity family explorer | 6 | 0 | 4 | 0 |
| Older cultural explorer couple | 4 | 0 | 1 | 0 |
| Pre-family explorer | 8 | 0 | 4 | 0 |
| Scenic explorer couple | 9 | 0 | 1 | 0 |
| Other | 11 | 0 | 2 | 0 |
| Total | 38 | 0 | 12 | 0 |

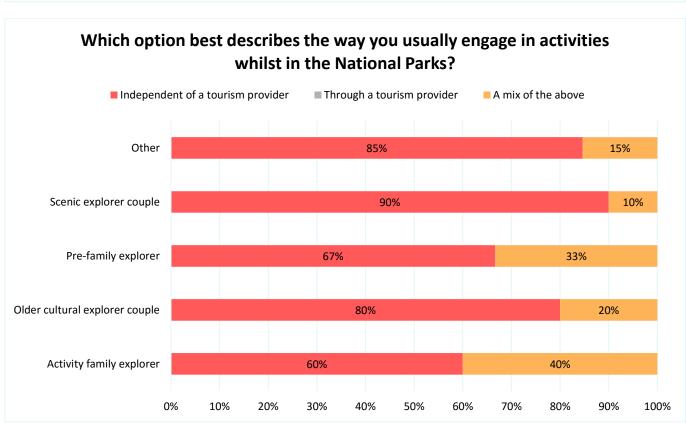












APPENDIX E - TRADE QUESTIONNAIRE

TACP are working with the three National Parks in Wales to develop Dark Skies: Brilliant Parks; a suite of activities and adventures with associated branding and market plan to help promote the National Parks and their dark skies. As a provider of tourism within one of these National Parks it would be helpful to understand the work you are currently doing, what you have planned and any ideas regarding what would help your business.

- 1. Business name
- 2. Contact name
- 3. Contact details (preferably e-mail and telephone)
- 4. National Park
- 5. Tourism area (i.e. physical, nature, cultural/historical, astronomy)
- 6. Do you currently organise any after-dark/night sky activities for your customers?
- 7. How successful have these been?
- 8. What feedback have you received from customers (e.g. what they liked/didn't like)?
- 9. What methods do you employ to market these activities?
- 10. What promotional media works best for you?
- 11. Are there any after-dark/night sky activities you would like to offer but currently are not?
- 12. What help would be useful to promote your existing offerings and expand your ideas?
- 13. Would you be interested in attending a workshop to discuss this further towards the end of January (likely to be held in Snowdonia National Park or Brecon Beacons National Park)?

The following organisations/individuals were approached:

| Organisation | National Park | Individual |
|---|----------------|------------------|
| Brecknock Wildlife Trust | Brecon Beacons | Stephanie Coates |
| Storey Arms | Brecon Beacons | Andy Meek |
| Dan Yr Ogof Caves | Brecon Beacons | James Price |
| Hawk Adventures | Brecon Beacons | Matt Woodfield |
| Brecon Beacons Young Archaeologists' Club | Brecon Beacons | Natalie Ward |
| Heads of the Valleys Astronomy Society | Brecon Beacons | Mike Thomas |
| Usk Astromony Society | Brecon Beacons | David Thomas |
| Talyllyn Railway | Snowdonia | Lorraine |
| North Wales Wildlife Trust | Snowdonia | Rob Booth |
| Zip World | Snowdonia | Zahara |
| Coed y Brenin | Snowdonia | Grace Sanderson |
| Preseli Astronomy Society | Pembrokeshire | Robert Woodman |
| SeaTrust CIC | Pembrokeshire | Cliff Benson |
| TYF | Pembrokeshire | Jetske Germing |
| Boat operator (Pembrokeshire) | Pembrokeshire | Ffion Rees |

APPENDIX F - WORKSHOP

The following organisations/individuals attended the workshop held in Aberystwyth on January 29th 2016:

| Individual | Organisation |
|-----------------|---|
| Ruth Coulthard | Brecon Beacons National Park Authority |
| Jim Wilson | Brecon Beacons Park Society |
| Gareth Kiddie | Gareth Kiddie Associates |
| Julia Blazer | Good Day Out |
| Ian Foster | Hay Dark Skies Festival |
| Neil Mansfield | Landscapes Uncovered |
| Grace Sanderson | Natural Resources Wales |
| Hannah Buck | Pembrokeshire Coast National Park Authority |
| Jenn Jones | Pembrokeshire Coast National Park Authority |
| Medi George | Pembrokeshire Coast National Park Authority |
| Ifer Gwyn | Snowdonia National Park Authority |
| Naomi Jones | Snowdonia National Park Authority |
| Tim Rich | TACP (UK) Ltd |
| Tim Wroblewski | TACP (UK) Ltd |
| Bob Mizon | The Commission for Dark Skies |
| Huw James | To the Blue Group |

The following organisation/individuals were invited but unable to attend the workshop - they were sent the outcomes of the workshop by e-mail and invited to comment:

| Individual | Organisation |
|---------------------------|--|
| Nick Busby | Abergavenny AS |
| Stephanie Coates | Brecknock Wildlife Trust |
| Carol Williams | Brecon Beacons National Park Authority |
| Claire O'Connell | Cardiff AS |
| Brian and Kathy Brookshaw | Gwynderi B&B |
| Matt Woodfield | Hawk Adventures |
| Bill Richards | Hay Dark Skies Festival / Brecon Beacons Tourism |
| Nicola Edwards | Monmouthshire County Council |
| Rhian Sula | National Trust |
| Daisy Hughes | Pembrokeshire Coast National Park Authority |
| Libby Taylor | Pembrokeshire Coast National Park Authority |
| Michel Regelous | Pembrokeshire Coast National Park Authority |
| Rhonwen Owen | Pembrokeshire Coast National Park Authority |
| Robert Woodman | Preseli Astronomy Society |
| The Dean | St David's Cathedral |

| Andy Meek | Storey Arms |
|------------------|-------------------------------|
| Lorraine | Talyllyn Railway |
| Jetske Germing | TYF |
| Sharon Millar | Upper Usk Tourism Alliance |
| David Thomas | Usk Astronomy Society |
| Ffion Rees | Boat operator (Pembrokeshire) |
| Martin Griffiths | Dark Sky Wales |
| Allan Trow | Dark Sky Wales |

Discovery in the Dark Wales

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